COMPARISON OF THE TREATMENT OUTCOMES FOLLOWING FUSARIUM AND ASPERGILLUS KERATITIS

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CERTIFICATE

This is to certify that this dissertation entitled **"COMPARISON OF THE TREATMENT OUTCOMES FOLLOWING FUSARIUM AND ASPERGILLUS KERATITIS"** is a bonafide done by **Dr. M. SIVADARSHAN** under the guidance and supervision in the department of Cornea, Aravind Eye Hospital and Post Graduate Institute of Ophthalmology in Madurai during his residency period from June 2015 to May to 2018.

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DECLARATION

I, **Dr. M. SIVADARSHAN** solemnly declare the dissertation titled **"COMPARISON OF THE TREATMENT OUTCOMES FOLLOWING FUSARIUM AND ASPERGILLUS KERATITIS"** has been prepared by me. I also declare that this bonafide work or a part of this work was not submitted by me or any other for any award, degree, diploma to any other university board either in India or abroad. This dissertation is submitted to the **Tamil Nadu Dr. M. G. R. Medical University**, Chennai in partial fulfilment of the rules and regulation for the award of **M. S. Ophthalmology (BRANCH III)** to be held in May 2018.

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PART I

INTRODUCTION:[1,2,3]

Corneal diseases are a major cause of visual loss and blindness globally, second only to cataract. Ophthalmic mycoses are being increasingly recognised as an important cause of ocular morbidity and blindness and keratomycosis is the most frequent presentation. A larger proportion of keratitis is reported from developing countries than in developed countries. Bacteria, fungi and acanthamoeba are important aetiological agents in the developing world. Of these organisms that cause keratitis, fungi remain to be one of the most elusive and challenging organisms to diagnose and treat.

The incidence of mycotic keratitis in tropical and sub- tropical countries is more than 50% of all culture proven cases of keratitis. In mycotic keratitis, two types have been recognised: Keratitis due to filamentous fungi (especially *Fusarium* and *Aspergillus*), which commonly occurs in tropical and subtropical zones, and associated with corneal trauma (and concurrent contamination with vegetative material); and keratitis due to yeast-like and related fungi particularly *Candida*; and mostly associated with corneal disease, local immunosuppression caused by chronic corticosteroid use and systemic disease conditions that lower the host resistance. Ocular trauma is a major predisposing factor for fungal keratitis and most cases are reported from developing countries such as India and Ghana.

CLASSIFICATION OF FUNGI:[2,7,10,22]

Fungi are eukaryotic and heterotrophic organisms. The pathogenic fungi causing significant keratitis can be divided as follows:

1. Filamentous fungi
2. Yeast
3. Dimorphic fungi

FILAMENTOUS FUNGI:

Filamentous fungi also known as molds, they appear as long filaments, called hyphae, which grow by apical extension and form feathery aerial colonies above the culture media. They are further sub classified into septate and non- septate organisms. The septate filamentary fungi are the most common cause of mycotic keratitis. They are divided into non- pigmented monilial (Fusarium spp, Aspergillus spp and Acremonium spp) and pigmented dematiaceous (Curvularia spp, Lasiodiplodia spp) types. The non-septate filamentary fungi (Mucor, Rhizopus spp and Absidia) are important causes of orbital diseases and endogenous endophthalmitis, but do not commonly cause corneal disease.

YEASTS:

Yeasts are fungi with the usual and dominant growth as unicellular organisms and produce creamy, pasty colonies, which may be mistaken for staphylococcal colonies. They divide by sexual budding, forming

pseudo- hyhae and do not form mycelium in culture. The most common fungi in this type are the Candida spp and Cryptococcus spp, which are part of the normal flora of skin, respiratory tract and conjunctiva and act as opportunistic pathogens.

DIMORPHIC FUNGI:

These fungi possess two distinct morphologic forms: the yeast phase which occurs in tissues and a mycelia phase which occurs in media and natural surfaces. They include Blastomyces, Coccidiodes, Histoplasma and Sporothrix and they exhibit properties those of molds when cultivated at 25ºC and those of yeasts when cultivated at 37º C. The dimorphic fungi are a rare cause of mycotic keratitis.

RISK FACTORS:[2,9,12,16,21]

Fungi are ubiquitous organisms present almost everywhere in the environment. In fact they have been isolated from the conjunctival sac in 3% to 28% of healthy eyes in various studies. Despite the eye being constantly exposed to these pathogens, the normal defence mechanisms such as the eyelids, tear components and the corneal epithelium provide adequate protection. The fungi are unable to penetrate an intact, normal epithelium. An epithelial defect is a prerequisite for these organisms to initiate an infection. The various risk factors include:

I. OCULAR FACTORS:

1. Trauma

2. Chronic corneal inflammation

   - Herpes simplex
   - Herpes zoster
   - Vernal allergic conjunctivitis
   - Dry eye
   - Ocular surface disorders
   - Bullous keratopathy
   - Exposure keratopathy

3. Contact lens wear

4. Drugs

   - Corticosteroids
   - Anaesthetics

5. Corneal surgery

   - Penetrating keratoplasty
   - Refractive surgery

II. SYSTEMIC FACTORS

   - Diabetes mellitus
   - AIDS
   - Leprosy

Corneal trauma has been documented as the most common risk factor for mycotic keratitis in most of the studies. Corneal injury with vegetable matter or organic matter is reported in 55 to 65% of fungal keratitis. Agricultural workers in a rural setting and people working in warehouses storing agricultural products, especially onions and groundnuts are at an increased risk since the filamentous fungi are found in abundance in relation to these products.

Contact lens wear is an uncommon risk factor in fungal keratitis. These fungi have been shown to grow within the matrix of soft contact lenses. Filamentous fungi are more commonly associated with cosmetic lens wear and yeasts from therapeutic lens use. Corticosteroids appear to increase the virulence of fungi and its use has been associated with the development and worsening of fungal keratitis. Other factors uncommonly reported include vernal or allergic keratoconjunctivitis, exposure keratopathy, neurotrophic ulcers and penetrating keratoplasty. The predisposing factors for the development of fungal keratitis after penetrating keratoplasty include suture related problems, topical steroid use, contact lens wear, graft failure and persistent epithelial defects. Fungal corneal ulcers have also been reported following refractive surgical procedures like radial keratotomy, photo-refractive keratotomy and more recently following Laser in situ keratomileusis (LASIK) procedures.

PATHOGENESIS:[23,24]

The exact mechanisms underlying the pathogenesis of fungal infections are unclear. As compared to bacteria, the fungi are relatively non-immunogenic, partly because of their large size, which prevents them from being engulfed by the neutrophils, and partly because they do not secrete chemotactic factors, which attract inflammatory cells. After entering through a corneal epithelial defect, the fungi elaborate toxic substances and enzymes such as proteases, hemolysins and exotoxins. This invasion causes an innate and adaptive immune-mediated inflammation, resulting in tissue necrosis of the surrounding area. Fungi penetrate further into the stromal layers of the cornea causing tissue damage, scarring, and consequent opacification of the cornea. Fusarium spp, particularly, are known to possess specific cellular and molecular attributes, which aids them to cause virulent reaction. They can also adhere to biopolymers and have the ability to produce toxins and elaborate enzymes. The last in particular is thought to cause and potentiate Fusarial keratitis. Other toxins such as trichothene toxins elicit an inflammatory response even at low doses and cause destruction of many cell types at higher concentrations.

A few species of Aspergillus produce aflatoxins and ochratoxins. The conidia of Aspergillus fumigatus have been shown to bind to and degrade the basement membrane laminin, an extracellular matrix

glycoprotein found in basement membranes. They have the capacity to penetrate an intact Descemet's membrane. The resultant host inflammatory response subsequently contributes to the tissue damage. Activation of the complement system leads to concentration of polymorphonuclear inflammatory cells in the cornea.

CLINICAL FEATURES:[2,7,10,17,29]

Kaufman and Wood described the salient clinical features of mycotic keratitis in 1965. Some of the features like satellite lesions, presumed immune rings and endothelial plaques are probably not unique to fungal keratitis but are general features of a stromal inflammatory response in the cornea.

However, there are two features that lead on to suspect a fungal cause:

- Stromal infiltrate with feathery hyphate margins.
- Infiltrates that tend to be dry, gray and elevated above the level of the corneal surface.

OTHER FEATURES:

- Insidious onset
- Gradually progressive
- May or may not be associated with epithelial defects
- Presence of satellite lesions
- Presence of endothelial plaque

- May be associated with an immune ring
- Pigment deposition around the margins
- Presence of solid and cheesy hypopyon
- Descemet's folds
- Posterior corneal abscess
- Associated lid edema and chemosis

GENERAL SYMPTOMS:

The onset of fungal keratitis is almost always insidious. Symptoms are usually non-specific, although possibly more prolonged duration (5 to 10 days). Patients in general complain of a foreign body sensation for several days with a slow onset of increasing pain and diminution of vision especially if the keratitis involves the visual axis.

GENERAL SIGNS:

On slit lamp examination, the infiltrates appear greyish white or yellowish white and the base of the ulcer is often filled with soft, creamy and raised exudates. The fungal ulcers have characteristic findings, which include elevated areas, hyphate (branching) ulcers, irregular feathery margins, a dry rough texture, and satellite lesions. Feathery borders or hyphate edges are seen in 70% of the patients and satellite lesions are seen in 10 % of the patients. Hypopyon is generally fixed and may be

present in 45% to 66% of the cases. An immune ring, endothelial plaque and a posterior corneal abscess may also be present.

FILAMENTARY FUNGI:

Unlike bacterial infections, there is less pain, conjunctival congestion, discharge and chemosis early in the course of fungal infection and the symptoms are far less than what is expected of the size of the ulcer. Indeed, it may take several days before the patient seeks medical care. The earliest finding may be a small non-specific stromal infiltrate with a surrounding dry, sick looking epithelium, in which case it is indistinguishable from a bacterial infection. Commonly the patient presents with a central or a para-central ulcer with feathery margins. The most common misdiagnosis, which might be made at this stage, may be a dendritic keratitis caused by herpes simplex. These pseudodendritic lesions are shorter, stockier and are associated with surrounding stromal infiltration and greyish yellow. In addition, a mirror image of the pseudodendritic lesion in the deeper stromal layers can also be seen. The adjacent Descemet's membrane may be thrown into folds. As time progresses, the ulcer starts to become larger and elevated above the level of the corneal surface. The edges of the ulcer appear irregular, somewhat feathery. The surface looks dirty white and dry and have a soft texture except in pigmented fungi. The serrated edges and the dry elevated

surface can be considered pathognomonic of a fungal cause. The stromal lesions are present beyond the size of the epithelial defect and have a feathery pattern. In rare instances the lesion may be entirely in the posterior aspect of the stroma without an accompanying epithelial defect. In these cases, the posterior stromal lesions also have a feathery edge. Foci of infiltration can be seen several millimetres away from the main area of involvement. These are called satellite lesions and they may remain isolated from the main lesion or may be connected with the main ulcer by a thin line of stromal infiltration. The epithelium can be intact over the infiltrate. An endothelial plaque can be an accompanying finding. Like in many other keratitis, a ring infiltrate surrounds the primary lesion, most likely representing an antibody response to the fungal antigen. Less commonly, the entire lesion can start in the periphery and progress to form a ring infiltration and a ring abscess. Hypopyon can be seen in varying proportions and the amount is not directly proportional to the size of the ulcer. As the lesion progresses, the pain starts to get intense mostly due to secondary glaucoma and the ulcer starts to involve almost the whole of the cornea and starts to lose its characteristic pattern. The lesions look more suppurative. The edges of the ulcer may start becoming rounded like a bacterial ulcer, but the edges of the deeper stromal lesions have characteristic feathery pattern until the final course of the disease. As the size of the ulcer becomes larger, it

becomes more flushed with the surface and assumes a smooth surface. A significant majority of the deeper stromal ulcers may perforate over time.

LABORATORY DIAGNOSIS:[17,22,26-30]

Corneal ulcer scrapings from the ulcer edge and the base form the mainstay of the diagnosis of a case of fungal keratitis. Corneal scraping with a Kimura spatula or a surgical blade is preferred to the use a calcium alginate, dacron/ rayon swab, or a sponge-type material. The organisms may be deeper in the tissues and may not be accessible to a more superficial scraping. Corneal scraping not only provides diagnostic clues but also may be therapeutic as it also aids in the initial debridement and debulking of the organisms. Further, it also breaches the epithelium, which may provide better penetration of the anti-fungal agents. Cultures should also be sent from topically applied medications, cosmetics, contact lenses and their storage and cleaning solutions, wherever indicated. These items should be obtained from the patient at the initial visit. Apart from this anterior chamber tap and corneal biopsy may be done especially in cases of deep stromal keratitis and endothelial plaques. Laboratory diagnosis of fungal keratitis primarily includes direct microscopy, fungal cultures and newer diagnostic modalities such as Polymerase Chain Reaction (PCR) and Confocal microscopy. Presumptive identification of

fungi are based on the morphologic characteristics of hyphal forms and the size.

MORPHOLOGY OF FILAMENTOUS FUNGI:

FUSARIUM:

The Fusarium fungi are characterised by distinctive macroconidia and microconidia with the major identifying morphologic feature being the large banana shaped macroconidia that are produced on the short lateral hyphae or conidiospores.

ASPERGILLUS:

The conidiophore in Aspergillus fungi have a swollen terminal end, surrounded by flask shaped sterigmata, each of which produces long chains of coccoid conidia that radiate out from the terminal end, is highly diagnostic. The hyphae are septate and characteristically branch dichotomously.

LABORATORY TECHNIQUES:

1. Direct Microscopy:

Direct microscopy uses 10% KOH (Potassium Hydroxide) wet mount preparation and smears, which are stained by Gram and Giemsa stain.

a. KOH Wet Mount Preparation:

10 % KOH wet mount is simple, cheap, rapid and easy to interpret and is particularly useful in tropical countries. The fungal elements are colourless with this technique. KOH smear has a sensitivity of 72.2% to 91%.

b. Gram's stain:

Gram's stain is equally sensitive in detecting fungal organisms. Gram's stain identifies fungal species in 31.6% to 98%.

c. Giemsa stain:

The internal contents of filamentous fungi are blue and cell walls and septation if present are hyaline. Giemsa stain identifies fungal elements in 27% to 85% of the cases.

5. Lactophenol cotton blue: [28]

Lactophenol cotton blue has a sensitivity of 70 to 80 % in cases of fungal keratitis. The preparation has three components: phenol, which will kill any live organisms; lactic acid which preserves fungal structures, and cotton blue which stains the chitin in the fungal cell walls.

6. Grocott's methenamine silver stain:

Grocott's methenamine silver staining has a sensitivity of 89%.

FUNGAL CULTURE:

Culture media for suspected fungal keratitis should include the same culture media used for a general microbial keratitis workup. Sheep blood agar, Sabouraud dextrose agar (without cycloheximide) and thioglycolate broth should be inoculated. Sabouraud dextrose agar should contain 50 micrograms /ml gentamicin and should be without cycloheximide as the latter inhibits saprophytic fungi. Thioglycolate broth is inoculated for the possible growth of anaerobic bacteria at 35ºC to 37ºC. A definitive diagnosis of fungal keratitis is made if:

1. Corneal scrapings reveal fungal elements in smears,
2. Fungus grows in more than one medium in the absence of fungus in smears,
3. Fungus grows on a single medium in the presence of fungus in smears,
4. Confluent growth of fungus appears at the inoculated site on a single solid medium.

A fungus grown on the primary isolation medium may be subcultured onto a potato dextrose agar (PDA) medium and incubated for a period of 10 days to facilitate sporulation. Following adequate growth of the fungal isolate on PDA, the identification may be carried out based on its macroscopic and microscopic features. Positive cultures should be expected in 52 to 68 % of cases. Initial growth occurs within 72 hours in

83% of cultures and within 1 week in 97% of culture. Most in fact are visible with dissecting microscope or naked eye within 36 hours. But we should wait for at least a week before declaring a culture negative for fungi. Both yeast and hyphae readily grow in sheep blood agar and Sabouraud dextrose agar at room temperature. Increasing the humidity of the medium by placing the inoculated agar plates in plastic bags has also been recommended for enhancement of fungal growth.

CULTURAL CHARACTERISTICS:

FUSARIUM:

The colonies of Fusarium organisms are usually white in the early stages of development but often acquire a buff coloration. As the colonies mature, a variety of colour pigments ranging from yellow to red to purple are produced. Pigments that are secreted onto the agar are best seen on the undersurface of the colony. This is known as reverse pigmentation.

ASPERGILLUS:

Aspergillus is a large genus with many species but two are particularly prominent, Aspergillus fumigatus and Aspergillus niger. Colonies of A. fumigatus are white at first, but as spores are produced they become velvet green owing to the pigmentation of the conidia. A. fumigatus is able to tolerate unusually high temperatures and can grow in

vitro at 50°C. A. niger colonies are also white during the initial growth phase but turn completely black as they undergo sporulation.

NEWER DIAGNOSTIC MODALITIES:

More recent methods for the identification of fungi, although still not widely available, include immunofluorescence staining, electron microscopy, polymerase chain reaction and confocal microscopy. These newer diagnostic modalities may not be available at all places.

POLYMERASE CHAIN REACTION:

The technique requires only 4 hours to obtain results, quicker than the 2 days to 2 weeks required by culture methods and in future may become a valuable adjunctive tool for the diagnosis of fungal keratitis, although it cannot replace culture methods as the possibility of false positive results needs to be considered.

CONFOCAL MICROSCOPY:[29,30]

Confocal microscopy has recently been used in cases of fungal keratitis, which helps to identify the hyphal elements and the yeasts. Confocal microscopy is an imaging technique that allows optical sectioning of almost any material, with increased axial and lateral spatial resolution and better image contrast, which may be useful for the identification of corneal pathogens in the early stages of infection. In

clinical keratitis due to *Aspergillus* spp., fungal hyphae can be imaged as high-contrast filaments, 60 to 400Å long and 6Å wide. In patients with mycotic keratitis, in vivo scanning slit confocal microscopy helps in establishing the diagnosis and demonstrating the non-responsiveness to medical therapy by showing an increased load of fungal filaments, therefore aiding the treatment decision. Thus, confocal microscopy is a potentially useful, non-invasive technique to determine the presence of fungal hyphae in vivo within the human cornea. Limitations in the use of this technique for routine diagnosis relate to instrument configuration, movement of either the tissue or the microscope, difficulty in reproducibly returning to the area of interest for serial examination, lack of a distinctive morphology of some pathogens, and limited resolution of the microscope.

KERATECTOMY /BIOPSY:

If corneal scrapings for smears and cultures are negative, a diagnostic superficial keratectomy or corneal biopsy may become necessary. The biopsy can be performed in the minor operating room or at the slit lamp under topical anaesthesia using 0.5 % proparacaine and 2 % xylocaine eye drops. In some cases, eyelid and retrobulbar anaesthesia may be required. Under the microscope, a round 2 to 3mm sterile disposable dermatologic trephine is used and partial thickness

trephination is done in such a manner so that it encompasses both the clinically infected area and the adjacent clear cornea. The base is then undermined with a surgical blade to complete the lamellar keratectomy. The corneal biopsy specimen should be sent for smears, cultures, and histopathological examination. Corneal biopsy is considered to be superior to corneal scraping for the isolation of the fungal organisms.

CALCOFLUOR WHITE:

Calcofluor white has a sensitivity of 80 to 90 % in detecting the fungal pathogen. Excellent results can be achieved when the nonspecific fluorescent stain calcofluor white was used to stain corneal scrapes or biopsy specimens prior to direct microscopic examination.

TREATMENT:

MEDICAL THERAPY:[31-37]

The development of new ocular antifungal agents have been hindered by the small market that fungal keratitis represents when compared with systemic fungal infections. With the exception of Natamycin, most of the antifungals used were developed for use in systemic mycoses. Before the advent of the first effective antifungal agents in the mid 1950's, the medical treatment of fungal keratitis included methods such as sulphacetamide iontophoresis and thiomersal. Frequently, cauterisation and cryotherapy were used adjunctively. The

advent of the current antifungal medications has made a good impact on the management of the surface corneal infections. However, all the available antifungal agents are fungistatic and not fungicidal. The penetration of the drug is poor and has to be aided by repeated debridement, which acts by debulking of the pathogenic organism. The treatment schedules are often prolonged, often leading to poor compliance with medical therapy. Prompt and appropriate anti-fungal therapy is the mainstay of the treatment of fungal keratitis. Anti-fungal therapy should only be instituted where corneal scraping reveals the presence of fungal elements or cultures reveal the presence of fungal organisms at 36- 48 hours. Since the corneal epithelium serves as a barrier to the penetration of most tropical anti-fungal agents, debridement of the corneal epithelium is an essential component of the medical management of fungal keratitis.

The antifungal medications can be broadly divided into:

1. Polyenes
2. Azoles
3. Fluorinated pyrimidines
4. Echinocandins

1. POLYENES:

Polyenes constitute the first line of the antifungal agents. They bind preferentially to ergosterol in the fungal plasma membrane, thereby altering the membrane permeability and disrupting the fungal cell. Larger polyenes (such as Amphotericin B and Nystatin) create channels that span the cell membranes and allow electrolyte movement. Small polyenes such as Natamycin are too small to bridge the width of the cell membrane and causes localized membrane disruptions thus altering permeability.

NATAMYCIN:

Natamycin is a tetraene polyene and is the only antifungal commercially available in the United States in a topical ophthalmic form (Natacyn 5%, Alcon Laboratories). The agent was discovered in 1958, and it has proved itself to be the most valuable ocular antifungal agent. Available as 15 ml bottles, these containers may be stored at room temperature or refrigerated, but care should be taken to avoid freezing, exposure to light and high temperatures. Like other polyenes, it is insoluble in water. The commercial preparation is a suspension that must be shaken well before use. Natamycin often adheres to areas of corneal ulceration, perhaps increasing the duration of drug contact time. The drug cannot be administered systemically. Although the optimal dosing schedule for topical administration is not known, a loading dose approach

in which one drop is instilled into the conjunctival sac at half hour intervals appears appropriate initially. This rate can then be gradually reduced to one hourly drop 6-8 times daily after the first 3-4 days of administration. Natamycin has been considered to be poorly absorbed by the cornea. Fortunately, the relatively high total corneal drug concentration ensures that adequate amounts of bioactive drug are available. The corneal epithelium is a major barrier to corneal penetration. Removal of the epithelium dramatically enhances penetration and efficacy.

EFFICACY AND SPECTRUM OF ACTIVITY:

Natamycin is most effective against the filamentous fungi and has been of particular use in the treatment of Fusarium and Aspergillus infections, the commonest cause of fungal corneal ulcers around the world. However, treatment failures occur with this and other filamentous fungi. Numerous studies have established the primacy of natamycin in the treatment of fungal infections caused by filamentous fungi.

AMPHOTERICIN B:

Amphotericin B, a heptaene polyene, was the first polyene shown to be effective on treating systemic mycoses. Produced by Streptomycetes nodosus, it was identified in a soil culture from Venezuela in 1956 by Gold and colleagues. Amphotericin B is dispensed in 20 ml vials for

intravenous use containing 50 mg of amphotericin B powder, 41 mg of sodium deoxycholate and a sodium phosphate buffer. The powder is initially reconstituted to a concentration of 5mg/ml in 10 ml of sterile water for injection. For topical application, this solution is further diluted with sterile water to concentrations from 0.05% to 1%. Amphotericin B in solution should not be exposed to light. When stored at 36ºC, it retains potency for one week. The corneal epithelium appears to be a powerful barrier to corneal penetration of the drug. However, debridement of the epithelium greatly increases the penetration and efficacy. In the treatment of systemic mycoses, Amphotericin B is most efficacious against yeasts, particularly Candida and Cryptococcus sp. The agent is much less useful in filamentous fungal infections. It exerts antifungal activity against Aspergillus. In addition to its direct fungicidal activity, it has shown to have immunoadjuvant properties. The adverse effects of the topical application include stinging sensation on application, chemosis and punctuate epithelial keratitis. An initial dose of 0.15% is applied for every five minutes for half an hour as a loading dose and thereby hourly thereafter. Subconjunctival injections can cause conjunctival necrosis and should be avoided. Systemic administration of amphotericin B is nephro toxic and is ineffective in the treatment of fungal keratitis.

NYSTATIN:

Nystatin is another polyene antifungal agent that is used as an ointment or formulated eye drops (50,000 units/ ml) and can be used for superficial Candidal keratitis. The ointment preparation causes severe stinging sensation and patient compliance is poor for prolonged usage. It is too toxic for parenteral administration.

2. AZOLES:

The azole group of antifungal agents have five-membered organic rings which contain either two or three nitrogen molecules (the imidazoles and the triazoles respectively). The imidazoles include clotrimazole, miconazole, econazole and ketoconazole. The triazoles include fluconazole and itraconazole. These drugs exhibit their antifungal acitivity by having two mechanisms of action.

In lower concentration, they are fungistatic by inhibiting sterol 14 alpha demethylase, a microsomal P-450 related enzyme, which is needed in the demethylation of lanosterol in the synthesis of ergosterol. At higher concentrations, they are fungicidal which is due to the direct membrane damage to the phospholipids present in the fungal cell wall. However they are never able to achieve fungicidal concentration in the human cornea.

ECONAZOLE:

It is a dichlorimidazole and exhibits a wide spectrum of activity against filamentous fungi. A topical preparation of 1% econazole can be prepared and is well tolerated.

KETOCONAZOLE:

It inhibits ergosterol synthesis in vivo, thus damaging the fungal cell wall and altering the electrolyte concentration. The increased water solubility and enhanced systemic absorption are valuable properties of this drug.

FLUCONAZOLE:

A water soluble triazole is available in oral 100 mg capsules and intravenous solution. Although the minimal inhibitory concentrations of fluconazole are higher than other azoles in most susceptibility test systems, the in vivo activity of fluconazole does not parallel the efficacy in infections in animals and in clinical trials in humans. The recommended dose is 200- 40 mg/ day and is the same for oral and intravenous routes. It is useful in candida keratitis.

ITRACONAZOLE:

The newer oral triazole antifungal agent may also be helpful adjunctive agent in fungal keratitis. However it is quite hydrophobic, and

being 90% protein bound in the serum, it does not permeate the tissues as well as fluconazole.

VORICONAZOLE:

A new azole drug derived from fluconazole. Acts primarily through inhibition of cytochrome P450 dependent 14 alpha demethylase. This enzyme is responsible for the conversion of lanosterol to 14 alpha demethyl lanosterol. It has been shown to have a broad spectrum of activity against Aspergillus, Candida, Paecilomyces, Cryptococcus, Scedosporium, Curvularia and others. It has excellent in vitro activity with low MIC values against Candida and Aspergillus species which are known to be resistant to amphotericin B, fluconazole and itraconazole. Activity against Fusarium species is variable.

It has been also reported to be fungicidal against most Aspergillus species and some dematiaceous fungi. There is increasing trend of using topical, intrastromal, as well as oral routes in the treatment of fungal keratitis, and given its excellent penetration in the cornea, it is considered superior to natamycin by many authors. Studies have also reported the adjunctive therapy with natamycin in the face of no response to monotherapy to natamycin. Toxic effects include visual disturbances and skin rashes, which can be mild and transient. Elevations in hepatic enzymes can also occur.

POSACONAZOLE:

Posaconazole is a second-generation triazole. It is primarily indicated for the treatment of invasive fungal infections in onco-hematological patients. It is only available as an oral solution and should be administered at a dose of 200 mg four times daily or 400 mg twice daily. Gastrointestinal complaints are the only adverse effects. In vitro and in vivo studies show its broad spectrum activity against Candida spp., Cryptococcus neoformans, Aspergillus spp., and Fusarium spp., among others. Experience with its use in ocular infections is still limited, but initial results are encouraging. In a series of three cases of Fusarium keratitis progressing to endophthalmitis unresponsive to treatment with oral and topical voriconazole, a rapid therapeutic response to posaconazole was observed. However, comparative controlled studies with first-line antifungal agents are still lacking.

3. FLUORINATED PYRIMIDINES:

FLUCYTOSINE:

Fluocytosine (5- fluorocytosine) is a fluorinated pyrimidine. First synthesized in1957 as an antimetabolite in the treatment of leukemia, the antifungal properties of flucytosine were first described by Grunberg and colleagues in 1963. Flucytosine is transported across the fungal cell membrane by a specific permease elaborated by certain fungi. Once in the

cell, the agent is deaminated to fluororacil, a thymidine analogue that locks further fungal thymidine synthesis. Since mammalian cells do not normally metabolize flucytosine, it does not inhibit metabolic processes. The drug is well tolerated by the gastrointestinal tract. The therapeutic range can be achieved with the administration of a dose of 50- 150 mg/kg/day in divided doses. A topical preparation can be made by dissolving the contents of a capsule of flucytosine in artificial tears. The solution should be filtered before use to remove any undissolved flucytosine. Flucytosine has been used with success as a 1% solution topically.

4. ECHINOCANDINS:[36,37]

Echinocandins are semisynthetic lipopeptides. They inhibit the synthesis of glucan in the fungal cell wall through non-competitive inhibition of the enzyme 1,3-β-glucan synthase, causing osmotic imbalance and cell lysis. This class of drugs includes caspofungin and micafungin. Echinocandins have rapid fungicidal action against most Candida species. Echinocandins have fungistatic action against filamentous fungi such as Aspergillus, but not against Fusarium. Caspofungin is administered intravenously at a dose of 70 mg on the first day and 50 mg on the following days. Micafungin is also administered intravenously at a dose of 100 to 150 mg/day. Topical caspofungin at a

concentration 1.5 to 5 mg/ml was as effective as amphotericin B in the treatment of corneal ulcer by Candida albicans in an animal model.

MODALITIES OF DRUG DELIVERY:

TOPICAL THERAPY:

The topical anti-fungal therapy is the mainstay of fungal keratitis. Commercially available natamycin 5% suspension is the initial drug of choice for fungal keratitis. It should be given hourly during the day and two hourly at bedtime. In addition to the anti-fungal drugs a broad-spectrum antibiotic such as a fluoroquinolone may be given to prevent secondary bacterial infection. Additionally, cycloplegics such as homatropine eye drops may be given three times a day to relieve the component of iridocyclitis along with the anti-glaucoma medications in cases where the intraocular pressure is high on digital tonometry. The eye should be examined twice daily preferably under the slit lamp. Once the infiltrate started resolving, the frequency of topical natamycin is reduced to 2-hourly until the completion of resolution. The natamycin should be continued for 2 weeks after the resolution of infection in all cases. If worsening of the keratitis is observed on topical natamycin, topical amphotericin B 0.15% or topical voriconazole 1% may be added as a second agent. Amphotericin B is not effective against Fusarium species. The efficacy of Econazole 1% against filamentous fungi has been found

to be equivalent to natamycin 5%. The imidazoles (ketoconazole and miconazole) are used systemically for the treatment of keratomycosis because of their relatively reduced systemic toxicity.

INTRACAMERAL THERAPY:

Intracameral amphotericin B may be a useful modality in the treatment of severe keratomycosis not responding to topical natamycin. It ensures adequate drug delivery into the anterior chamber and may be especially useful to avoid surgical intervention in the acute stage of the disease. The procedure should be performed under strict aseptic conditions. If the infection involves the anterior capsule of the lens, care should be taken to avoid injury to the lens. Patients with deep keratomycosis unresponsive to conventional medical treatment are candidates for intracameral injections of 5 μg Amphotericin B in 0.1 ml 5% dextrose. Injections can be repeated in case of inadequate response.

INTRACORNEAL THERAPY:

A recent modality advocated for non healing fungal corneal ulcers is the use of intracorneal antifungal injections. They can be given as an intrastromal injection at the junction of clear cornea and infiltrates, using a 30-gauge needle in five quadrants to form a barrage around the ulcer. This would raise the local concentration of the antifungal agent enough to be effective in the eradication of the deep corneal infection. Amphotericin

B in 5-7.5 µg dosage or voriconazole in 50 mg in 0.1 ml can be injected. Various studies have shown that intrastromal voriconazole may be used as a modality of treatment for recalcitrant fungal keratitis.

RESPONSE TO THERAPY:

Since fungal keratitis responds slowly over a period of weeks, clinical signs of improvement should be noted which include the following: diminution of pain, decrease in size of infiltrate, disappearance of satellite lesions, rounding out of the feathery margins of the ulcer.

DURATION OF TREATMENT:

In general the duration of treatment is longer than that for cases of bacterial keratitis. The clinician must determine the length of treatment for each individual based on clinical response. The duration of the treatment for topical treatment has not been firmly established clinically or experimentally and varies from 30 to 39 days. Problems that can rise from prolonged treatment are due to toxicity. The inflammatory response from this toxicity can be confused with persistent infection. If toxicity is suspected and if adequate treatment has been given for at least 4 to 6 weeks, treatment should be discontinued and the patient carefully observed for evidence of recurrence.

DRUG INTERACTIONS:

Several topical anti-fungal medications act synergistically against a particular fungal organism. In clinical series more than one concurrent topical anti-fungal has been needed 5% of the time. Synergistic drugs include a combination of amphotericin B and flucytosine, (for *Candida* keratitis) and a combination of natamycin and ketoconazole (for *Aspergillus* keratitis). Likewise, experimental models have demonstrated the potential antagonism between anti-fungals such as amphotericin B and the imidazoles.

DRUG RESISTANCE:

Resistance to anti-fungal agents is rare and generally occurs when they are used for systemic mycoses. Competition for volume in the pre corneal tear film and washout may be of more concern when using two topical antifungals.

SYSTEMIC THERAPY:

The use of systemic anti-fungal agents is generally not indicated in the management of fungal keratitis. Treatment with a systemic anti-fungal agent is recommended in cases of very large ulcers, severe deep keratitis, scleritis and endophthalmitis. Systemic anti-fungals also may be used as prophylactic treatment after penetrating keratoplasty for fungal keratitis. The drugs, which have been used systemically, include ketoconazole,

itraconazole and fluconazole. The most frequently used oral anti-fungal is ketoconazole, which is given in the dose of 600 mg per day. It is mandatory to assess liver function tests every 2 weeks after starting ketoconazole.

SURGICAL THERAPY:[38-43]

DEBRIDEMENT:

Daily debridement with a spatula or blade is the simplest form of surgical intervention and is usually performed at the slit lamp under topical anaesthesia. Debridement is performed every 24 to 48 hours and works by debulking organisms and necrotic material and by enhancing the penetration of the topical antifungal.

THERAPEUTIC KERATOPLASTY:

Approximately one third of fungal infections result in either medical treatment failures or corneal perforations. The main goals are to control the infection and maintain the integrity of the globe. Most retrospective series indicate that keratoplasty was performed within 4 weeks of presentation, primarily because of medical treatment failures; in some cases it may be required because of recurrence of infection. When progression of the keratitis is noted, penetrating keratoplasty should be performed. If the infectious process is allowed to progress until it

involves the limbus or sclera, unfavourable outcomes secondary to scleritis, endophthalmitis, and recurrence are more common. Therapeutic keratoplasty should be performed in cases of impending perforations, frank perforations > 2mm or if there is no response to therapy. The technique of the keratoplasty is similar to that performed for other forms of microbial keratitis. The size of the trephination should leave a 1 to 1.5mm clear zone of clinically uninvolved cornea to reduce the possibility of residual fungal organisms peripheral to the trephination. 5 Interrupted sutures with slightly longer bites should be used to avoid cheese wiring of the suture if the edge of the recipient becomes involved with a persistent organism. Irrigation of the anterior segment should be performed to eliminate any organisms. As far as possible the lens should be left untouched to prevent the spread of infection in the posterior segment. However, if affected the intraocular structures including the iris, lens, and vitreous may be excised. The specimens removed should be submitted to both the microbiology and pathology laboratories for culture and fixed section examination. If involvement of intraocular structures or endophthalmitis is suspected, an antifungal agent should be injected which includes amphotericin B (5µg/0.1ml) or miconazole (25µg/ 25µg/0.1ml). It is mandatory to submit surgical specimens from cases of microbial keratitis for histopathologic examination especially if the microbiologic diagnosis is not known. Histopathologic examination of

corneal buttons can reveal the presence of fungal elements in 75% patients. It has been shown that 59% of corneas infected by fungi are still culture-positive at the time of keratoplasty, with 90% of eyes exhibiting hyphal elements on pathologic examination. Fungal hyphae usually lie parallel to the corneal surface and lamellae. A vertical or perpendicular arrangement of fungal hyphae in the corneal stroma has been associated with increased virulence and in patients on topical corticosteroid therapy. Descemet's membrane may function as a barrier for invasion of microorganisms. Fungi have been shown to penetrate through an intact Descemet's membrane. After penetrating keratoplasty, topical antifungal agents should be continued to prevent recurrence of infection. Postoperatively, systemic keatoconazole or fluconazole may be used in addition to topical anti-fungal agents. If the pathology laboratory reports that no organisms were seen at the edge of the corneal specimen, antifungals could be stopped after 2 weeks and the patient followed carefully for recurrences. A report from the microbiology laboratory regarding growth of organisms from the corneal or intraocular tissues should indicate the need for more prolonged topical and systemic anti-fungal therapy, possibly for 6 to 8 weeks. The use of topical corticosteroids in the postoperative management of fungal keratitis is controversial. At the time of keratoplasty, if the infection has been controlled clinically, topical corticosteroids may be used. If it is not

known whether the infection is controlled, corticosteroids should be avoided during the early postoperative period. Although the main goal of penetrating keratoplasty in fungal keratitis is to eliminate the infecting organism, a secondary goal is the maintenance of a clear corneal transplant for optical reasons. Even if graft failure or rejection occurs, the patient can undergo a second optical keratoplasty once the rejection is controlled.

REVIEW OF LITERATURE:

Review of literature was done using PubMed search.

Whitcher et al [1]: Ocular trauma and corneal ulceration are significant causes of corneal blindness and are responsible for 1.5–2.0 million new cases of monocular blindness every year.

Srinivasan et al [2]: A prospective study of 434 patient with central corneal ulceration were evaluated. A history of previous corneal injury was present in 65.4% of patients. Cornea cultures were positive in 68.4%. Of those individuals with positive cultures 46.8% had pure fungal infections. The most common fungal pathogen isolated was Fusarium spp, representing 47.1% of all positive fungal cultures, followed by Aspergillus spp (16.1%).

Leck et al [3]: A multicenter study done in Ghana and southern India evaluated 1090 patients with suspected microbial keratitis. Overall the principal causative micro-organisms in both regions were filamentous fungi (42%). Fusarium species and Aspergillus species were the commonest fungal organisms isolated.

Prajna et al [4]: The mycotic ulcer treatment trial, which was a randomized trial comparing natamycin and voriconazole. A total of 940 patients were screened and 323 were recruited in the trial. Causative

organisms included Fusarium (128 patients [40%]), Aspergillus (54 patients [17%]), and other filamentous fungi (141 patients [43%]). Those cases treated with natamycin had significantly better 3-month best spectacle-corrected visual acuity than voriconazole treated cases (regression coefficient=0.18 logMAR; 95% CI, 0.30 to 0.05; P=.006). The group on treatment with natamycin were less likely to have perforation or require therapeutic penetrating keratoplasty (odds ratio=0.42; 95% CI, 0.22 to 0.80; P=.009). Fusarium cases fared better with natamycin than with voriconazole (regression coefficient=0.41 logMAR; 95% CI,0.61 to 0.20; P<.001; odds ratio for perforation=0.06; 95% CI, 0.01 to 0.28; P<.001), while non-Fusarium cases fared similarly (regression coefficient=0.02 logMAR; 95% CI, 0.17 to 0.13; P=.81; odds ratio for perforation=1.08; 95% CI, 0.48 to 2.43; P=.86). The study concluded that treatment with natamycin was associated with significantly better clinical and microbiological outcomes than those treated with voriconazole for smear-positive filamentous fungal keratitis, with much of the difference attributable to improved results in Fusarium cases.

Prajna et al [5]: A multicenter, double-masked, clinical trial which included 120 patients with fungal keratitis were randomized to receive either topical natamycin or topical voriconazole. Upon comparison

between the two groups, voriconazole-treated patients had an approximately 1-line improvement in BSCVA at 3 months after adjusting for scraping in a multivariate regression model but the difference was not statistically significant (P=.29). Scar size at 3 months was slightly greater with voriconazole after adjusting for scraping (P=.48). Corneal perforations in both the groups were not significantly different (P>.99). Scraping was associated with worse BSCVA at 3 months (P=.06). Patients with the baseline BSCVA of 20/40 to20/400 showed a trend toward a 2-line improvement in visual acuity with voriconazole (P=.07). However, there was no significant difference in visual acuity, scar size, and perforation between voriconazole and natamycin treated patients.

Prajna et al [6]: A randomized clinical trial comparing 2% econazole and 5% natamycin for the treatment of fungal keratitis. There were no significant differences between the two groups at baseline or for success (defined as a healed or healing ulcer) at final visit (p = 0.79) and thus 2% Econazole appeared to be as effective as 5% natamycin for the treatment of mycotic keratitis.

Xie et al [7]: Fungal keratitis constituted 61.9% of cases of severe infective keratitis in north China. Males (60.6%) were more likely to be affected than females (39.4%). Corneal trauma (51.4%), especially injury from plants (25.7% in all patients), was the most commonly associated

risk factor. Direct microscopic examination of the corneal scraping samples after staining with potassium hydroxide showed positivity in 88.7% of the eyes. The fungal isolates found were of Fusarium species in 437 eyes (73.3%) and Aspergillus species in 72 eyes (12.1%). Surgical interventions were performed in 604 eyes (92.4%), including therapeutic penetrating keratoplasty in 399 eyes (66.0%) and therapeutic lamellar keratoplasty (LK) in 177 eyes (29.3%).

Prajna et al [8] compared results of 47 subjects on concurrent use of 5% natamycin and 2% econazole. Baseline characteristics were similar between the 2 groups. There were no significant differences (P = 0.9) between the two groups for success (defined as a healed or healing ulcer). Concurrent use of 5% natamycin and 2% econazole did not have additional benefits over monotherapy with 5% natamycin for the management of fungal keratitis.

Miedziak et al [9]: Old age (P=0.001), delay in referral to the corneal specialist (P<0.03), and treatment with topical steroids prior to initial presentation (P<0.0001) were statistically significant factors associated with the need for penetrating keratoplasty. A past history of ocular surgery (P=0.01), poor visual acuity at presentation (P<0.001), central location of ulcer(P<0.0001), large size of ulcer (P<0.0001), presence of perforation or descemetocele (P<0.0001), involvement of

limbus (P<0.0001), and presence of hypopyon (P=0.05), were all associated with the need for penetrating keratoplasty.

Anuradha et al [10]: A prospective hospital-based study. Mycotic keratitis was diagnosed in 191 (39%) out of the total study population of 485 cases. Direct microscopic examination of KOH mounts and Gram-stained smears revealed presence of fungal elements in the corneal scrapings in 119 (62.3%) and114 (60%) of the subsequently fungal culture-positive cases, respectively. Men (68%) were more commonly affected than women (32%). Young adults 31–40 years of age were the most common age group to be involved (36%). Multiple predisposing risk factors were noted in 79%, with corneal trauma 42%, contact lens wear 25%,and topical corticosteroids in 21% patients. The spectrum of fungi isolated were Aspergillus species in 78 (41%) followed by Curvularia species in 55 (29%), in contrast to other studies from Southern India.

Lalitha et al [11]: A prospective study to characterize the antimicrobial susceptibility of filamentous fungi. The 90 fungal isolates included 41 Aspergillus species,38 Fusarium species, and 11 others. The triazoles and caspofungin had the lowest MICs against Aspergillus species; voriconazole, amphotericin B, and posaconazole had the lowest MICs against Fusarium species, and none of the Fusarium species were

inhibited by itraconazole or caspofungin. Amphotericin B had significantly lower MICs compared with natamycin, but after correcting for the typical prescription dose, natamycin was superior. In conclusion no single agent was universally most effective, but voriconazole and other triazoles demonstrated the broadest spectrum. Itraconazole and caspofungin were not effective against Fusarium species.

Jurkunas et al [12]: A detailed study on demographics and pathogens for fungal keratitis cases diagnosed at the Massachusetts Eye and Ear Infirmary. During 2004–2007, the rate of fungal keratitis was 1.0 cases per month, an increase from the baseline rate of 0.5 cases per month during 1999–2002. The proportion of cases caused by filamentous fungi increased from 30% (1999–2002) to 65% (2004–2007) (P = 0.01). Soft contact lens wear accounted for 41% of fungal keratitis cases in 2004–2007, as compared with 17% in 1999–2002.The majority of patients (70%) received oral antifungal treatment in addition to topical amphotericin B and natamycin. Seventeen patients (40%) required therapeutic keratoplasty. Patients with a history of corneal transplant had the highest rate of therapeutic keratoplasties (67%) and had the poorest visual outcome (40% counting fingers or less). In the contact lens group, 94% of patient maintained vision of at least 20/40 and only 12% required surgery to control the infection.

Bharathi et al [13] reported a large series of fungal ulcers (1095) occurring in South India. This retrospective study involved 3183 patients with corneal ulcer in a 3-year period from a single tertiary eye care center. Out of 3183 patients, 1095 (34.4%) had fungal keratitis. The Fusarium species was the principal pathogen (42.82%) Male patients were commonly affected (65%). Most of them (66.85%) were in the younger age group (21–50 years).Fungal keratitis patients had experienced ocular trauma (92%) and vegetable injury (61%). The sensitivity of KOH was 99%.

Sengupta et al [14]: A retrospective study on 3059 cases of presumed microbial keratitis, 1756 had positive cultures (57.4%). Among the culture-positive cases, fungal pathogens were isolated from 1224 cases (70%), 488 (27.7%) showed bacterial growth, 18 (1.03%) grew acanthamoeba species and 26 (1.5%) demonstrated mixed bacterial and fungal growth. The percentage of fungal isolates in culture-positive cases increased gradually over the study period from 59% in 2004 to 78% in 2009. This increase in frequency of fungal keratitis was statistically significant (P = 0.023). A proportionally decreasing trend was seen in the number of bacterial isolates ranging from 31% in 2003–2005 to 22% in 2009 (P = 0.04).

Lalitha et al [15] described the minimum inhibitory concentration (MIC) of fungal isolates to natamycin and voriconazole. Of the 323 patients, MICs were available for 221 (68%). Fusarium (N=126) and Aspergillus species (N=52) were the most commonly isolated organisms. MICs to natamycin and voriconazole were significantly different across all genera (P<0.001). The MIC median (MIC50) and 90th percentile (MIC90) for natamycin were equal to or higher than voriconazole for all organisms, except Curvularia species. Compared to other organisms, Fusarium species isolates had the highest MICs to voriconazole and A. flavus isolates had the highest MICs to natamycin. These results were similar to previous reports except that the voriconazole MIC90 against Aspergillus species was 2-fold higher and the natamycin MIC90 against A.fumigatus was 4-fold higher. Fusarium isolates were least susceptible to voriconazole and A. flavus isolates were least susceptible to natamycin when compared to other filamentous fungi.

Gupta et al [16]: This was a clinico-demographical study done in North India and 209 cases of keratitis were studied, culture yielded growth in 80 cases (38.3%). Out of these 80 cases of growth, fungi were isolated in 77.5% and bacteria in 22.5%. The spectrum of keratomycosis was Aspergillus flavus (22.5%), Fusarium solani (16.1%), A. fumigatus (11.3%), Candida albicans (6.4%).

Basak et al [17] reported the epidemiologcial pattern and risk factors involved in suppurative corneal ulceration in eastern India. Over a three-year period, 1198 patients with suppurative keratitis were evaluated. Ocular trauma was the most common predisposing factor in 994 (82.9%) patients (P<0.0001), followed by use of topical corticosteroids in 231 (19.28%) patients. Cultures were positive in 811 (67.7%) patients. Among these culture positive cases, 509 (62.7%) patients had pure fungal infections (P<0.001), 184 (22.7%)patients had pure bacterial infections and 114 (14.1%) had mixed fungal with bacterial infections. Acanthamoeba was detected in 4 (0.49%) patients. The most common fungal pathogen was Aspergillus spp representing 373 (59.8%) of all positive fungal cultures (P<0.0001), followed by Fusarium spp in 132 (21.2%) instances.

Sun et al [18] assessed the association between minimum inhibitory concentration (MIC) and clinical outcomes in a fungal keratitis clinical trial. A 2-fold increase in MIC was associated with a larger 3-month infiltrate/scar size (0.21mm, 95% confidence interval [CI] 0.10–0.31, P <0.001) and increased odds of perforation (odds ratio [OR] 1.32, 95% CI 1.04–1.69, P=0.02). No correlation was found between MIC and 3-monthvisual acuity. For natamycin-treated cases, an association was found between higher natamycin MIC with larger 3-month infiltrate/scar

size (0.29 mm, 95% CI 0.15–0.43, P<0.001) and increased perforations (OR 2.41, 95% CI 1.46–3.97, P<0.001). Among voriconazole-treated cases, the voriconazole MIC did not correlate with any of the measured outcomes in the study. This study concluded that decreased susceptibility to natamycin was associated with increased infiltrate/scar size and increased odds of perforation and there was no association between susceptibility to voriconazole and outcome.

Sharma et al [19] assessed the outcomes of therapeutic penetrating keratoplasty from a tertiary eye care centre in northern India. In this retrospective interventional study, a cohort of 506 eyes that underwent a TPK for microbial keratitis was evaluated. TPK was performed in cases of recalcitrant microbial keratitis with impending perforation (descemetocele formation) or perforation (>3 mm). Anatomical success was seen in 454 eyes (89.7%). Preoperatively, the corrected distance visual acuity was <3/60 in 495 eyes (97.8%); after performing the TPK, the corrected distance visual acuity was <3/60 in 249 eyes (49.2%), 3/60 to 6/60 in 182 eyes (35.9%), and >6/60 in 75 eyes (14.8%). Eyes with smaller grafts (<9 mm) had better anatomical and visual outcomes compared with eyes with larger grafts (9-11 mm; P = 0.03 and >11 mm; P = 0.0). A higher success rate was achieved with pure bacterial or fungal organisms rather than with mixed infections. A higher incidence

of secondary glaucoma was seen in eyes with perforated ulcers (29.36%; 111/378) than in eyes without perforation (11.71%; 15/128) (P <.01) and in eyes with larger graft sizes (>11 mm and 9-11 mm) than in eyes with smaller graft sizes (<9 mm) (P <0.01).

Sharma et al [20] compared the efficacy of topical voriconazole and topical natamycin with that of intrastromal voriconazole and topical natamycin in patients with recalcitrant fungal keratitis. The patients in both groups had comparable baseline parameters. The mean BSCVA after treatment was 1.295 ± 0.5 logarithm of the minimum angle of resolution (logMAR) units in the topical group and 1.692 ± 0.29 logMAR units in the intrastromal group. The visual acuity after treatment was significantly better in the topical voriconazole group (P = 0.008). Nineteen patients receiving topical voriconazole and 16 patients who were given intrastromal voriconazole healed with therapy. Topical voriconazole seems to be a useful adjunct to natamycin in fungal keratitis not responding to topical natamycin. However intrastromal injections do not offer any beneficial effect over topical therapy.

PART II

AIM:

To compare the treatment outcomes following Fusarium and Aspergillus keratitis in a tertiary eye care centre.

OBJECTIVES:

PRIMARY:

1. Best corrected visual acuity (BCVA) at 3 months from enrollment.

SECONDARY:

1. Time to re-epithelialization.
2. Scar size at 3 months from enrollment.
3. Ulcers healed with monotherapy (Natamycin).
4. Incidence of corneal perforation or need for therapeutic penetrating keratoplasty (TPK).

STUDY DESIGN:

- It is a hospital based prospective, non randomized, observational clinical study.

PLACE OF STUDY:

- The study was conducted in the department of Cornea, Aravind Eye Hospital and Post Graduate Institute of Ophthalmology, Madurai, Tamil Nadu.

STUDY POPULATION:

- Patients with fungal corneal ulcers which are culture positive for Fusarium or Aspergillus species.

SAMPLING TECHNIQUE:

- Non probable convenient sampling

SAMPLE SIZE:

- All culture proven Fusarium and Aspergillus fungal keratitis cases presenting to the cornea department during the study period.

DURATION OF THE STUDY:

- Study period: 01/12/2015 to 28/02/2017.

(Inclusive of a follow up period of 3 months)

INCLUSION CRITERIA:

1. Presence of corneal ulcer at presentation (defined by an epithelial defect and stromal inflammation)
2. Fusarium or Aspergillus species identified on culture media.
3. Ulcer area of at least 2 mm^2.
4. The patient must have a basic understanding of the study and to return for follow- up visits.
5. Appropriate consent

EXCLUSION CRITERIA:

1. Impending perforation at presentation.
2. Perforation at presentation.
3. Ulcer area greater than 60 mm^2.
4. Evidence of mixed infection (bacteria) on Gram stain.
5. Evidence of Acanthamoeba keratitis.
6. Evidence of herpetic keratitis.
7. Age <16 years
8. Bilateral ulcers

METHOD:

This is a hospital based, prospective, observational study. The patients for this study were recruited from the department of Cornea, Aravind Eye Hospital, Madurai. Each patient with keratitis who presented to the department had a clinical examination using a slit lamp biomicroscope to measure size and depth of ulceration following a detailed clinical and demographic history. The visual acuity was checked using Snellen's chart at 6 meters. A calibrated slitlamp biomicroscope was used to assess the size of the infiltrate or scar, epithelial defect, depth, hypopyon, and ocular adverse events at enrollment, 3 weeks from enrollment and 3 months from enrollment. Infiltrate or scar size and epithelial defect size were measured in a protocol identical to the Steroids for Corneal Ulcers Trial by measuring the longest dimension and the longest perpendicular, a protocol adapted from the Herpetic Eye Disease Study. As in the Steroids for Corneal Ulcers Trial, re- epithelialization was defined as the absence of an epithelial defect with the administration of fluorescein.

The site of the ulcer was defined as either being entirely in the periphery or overlapping the central 4-mm circle and periphery without filling the centre or entirely in the central 4-mm circle or entirely filling the 4-mm circle and extending to the periphery. The depth was assessed

in 3 categories: more than 0% to 33%; more than 33% to 67%; and more than 67% to 100%. Lacrimal duct syringing and random blood sugar level measurement were additionally done for all patients.

MICROBIOLOGICAL METHODS:

The corneal scrapings were obtained after determination of baseline visual acuity and slitlamp examination and after administration of topical anesthetic agent (tetracaine hydrochloride, 0.5%, or lidocaine hydrochloride, 4%). Under magnification, a flame-sterilized Kimura spatula was used to obtain a scrape from the leading edge and base of the corneal ulcer. Two scrapings were smeared directly on separate glass slides for Gram staining and 10% potassium hydroxide wet mount. Subsequent scrapings were directly inoculated onto blood agar and potato dextrose agar for bacterial and fungal cultures.

Fungal smears were considered positive when fungal elements were seen under low-power magnification and reduced light. Fungal cultures were considered positive with growth on any 2 media or moderate to heavy growth on 1 medium. Patients with proved fungal keratitis (smear and culture positive for fungus) with an ulcer area of at least 2 mm^2 and not more than 60 mm^2 were identified as potential participants for the study. Patients who were not willing to be part of the

study, and who did not meet the inclusion criteria were excluded from the study.

Depending upon the presenting features the patients were started on topical anti fungal medications, either topical 5% Natamycin suspension eye drops as monotherapy or in combination with either 1% Voriconazole eye drops or 1% Itraconazole eye ointment. Additionally, 1% atropine sulphate ointment was applied three times per day in the affected eye at least 15 minutes after the application of the antifungal eye drops. Additionally, details of signs including lid oedema, congestion of the conjunctiva, and hypopyon were recorded for each pateint. The presence or absence of hypopyon in the anterior chamber was noted, and quantified in millimetres. The patients were followed up regularly with a constant emphasis on 3 weeks and 3 month follow up periods, measuring the size and depth of the infiltrate.

The primary outcome was best spectacle-corrected visual acuity (BSCVA) 3 months from enrollment. Secondary outcomes included scar size at 3 months, time to re- epithelialisation, the incidence of ulcers healed with monotherapy (Natamycin) and the incidence of corneal perforation and/or the need for therapeutic penetrating keratoplasty (TPK).

END POINT:

1. HEALED:

We defined a healed corneal ulcer as a completely healed epithelial defect with no stain on fluorescein application, and non-progression of the stromal infiltration.

2. HEALING:

A corneal ulcer was considered to be healing if the epithelial defect decreased in size by at least 20%, with non-progression or decrease in the size of the stromal infiltration by at least 20%.

3. REMAINED SAME:

A corneal ulcer was considered to remain the same if the size and depth of the infiltrate remained the same after initiation of treatment.

4. WORSENED:

An ulcer was considered to have worsened if the size and depth of the ulcer increased by at least 20%, or if the ulcer perforated.

End points 1 and 2 were considered as effective treatment while end points 3 and 4 were considered as non effective treatment.

DATA COLLECTION TECHNIQUE AND TOOLS:

All the data from the primary source was collected by an individual interview, observation and complete ophthalmic examination of the subjects as per the preset proforma and any additional information like complications and its management was mentioned in detail. Later these primary data was entered in a Microsoft Excel sheet for a complete database. Data was also collected from secondary sources like Pubmed, Medline, Cochrane and various journals for comparison with the primary data.

STATISTICAL METHODS:

- Mean (SD) or Frequency (Percentage) was used for continuous and categorical variables respectively.
- Student's t-test or Mann- Whitney U test was used to assess the difference between the continuous variables.
- Fisher's exact test or chi-square test was used to assess the difference between the categorical variables.
- P-value of less than 0.05 was considered as statistically significant.
- Microsoft Excel sheet was used as a database tool.
- All statistical analysis was done by statistical software STATA 11.0 (Texas, USA).

CLINICAL PHOTOS OF FUNGAL CORNEAL ULCERS

FIGURE 1: FEATHERY MARGINS

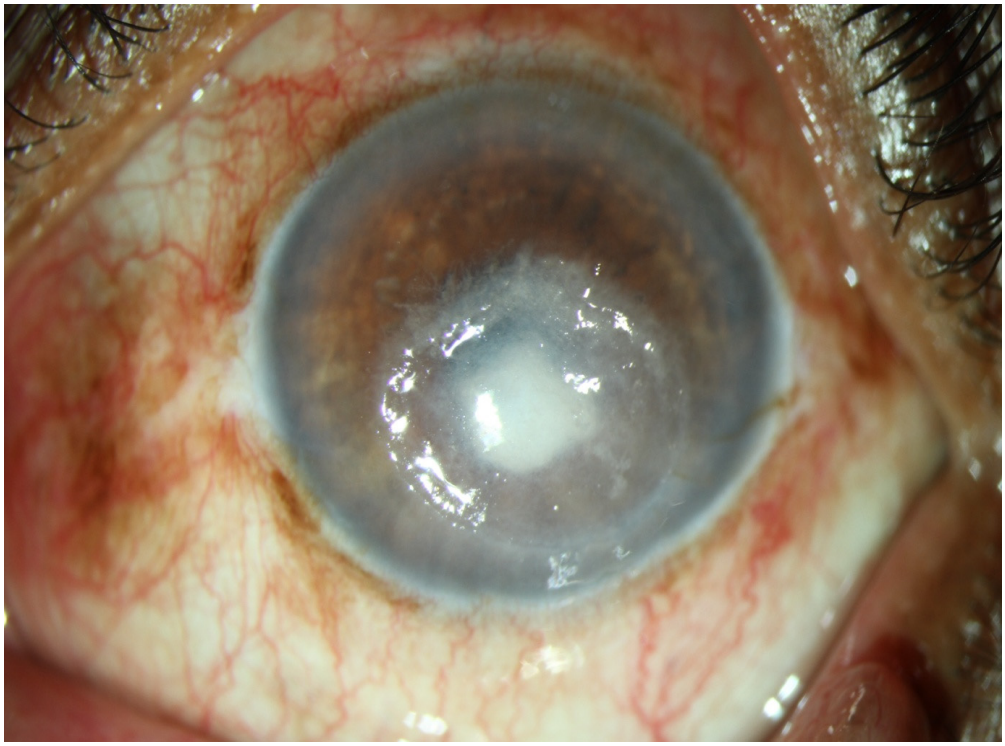


FIGURE 2: SATELLITE LESIONS

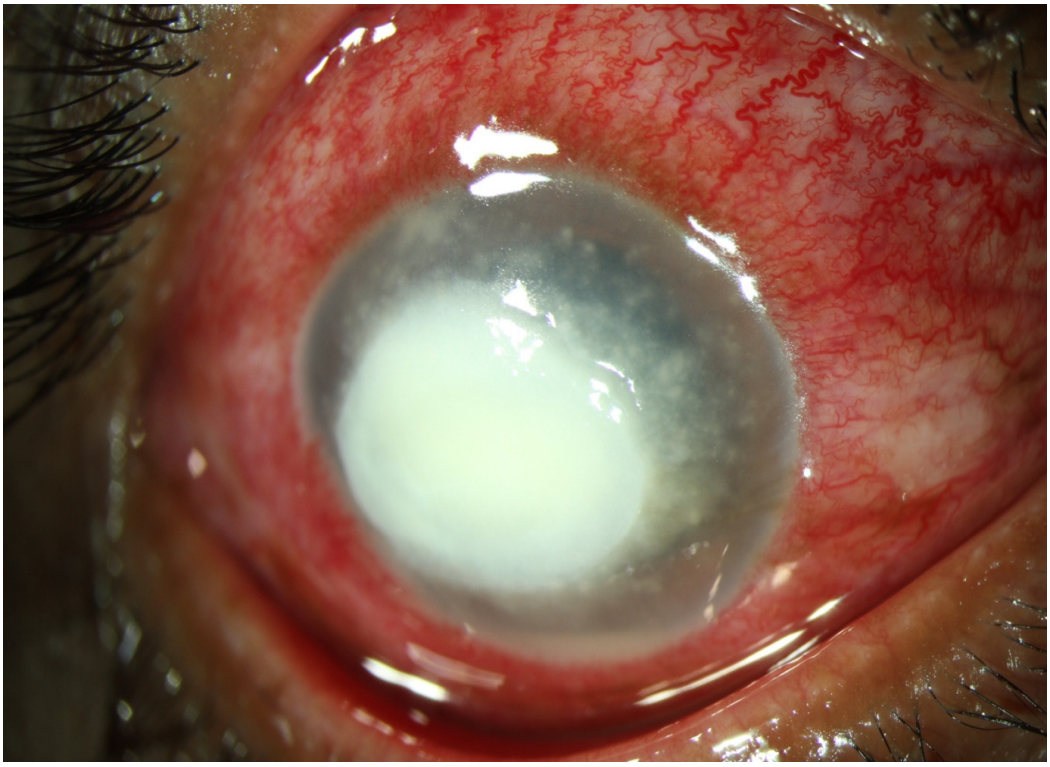


FIGURE 3: HYPOPYON

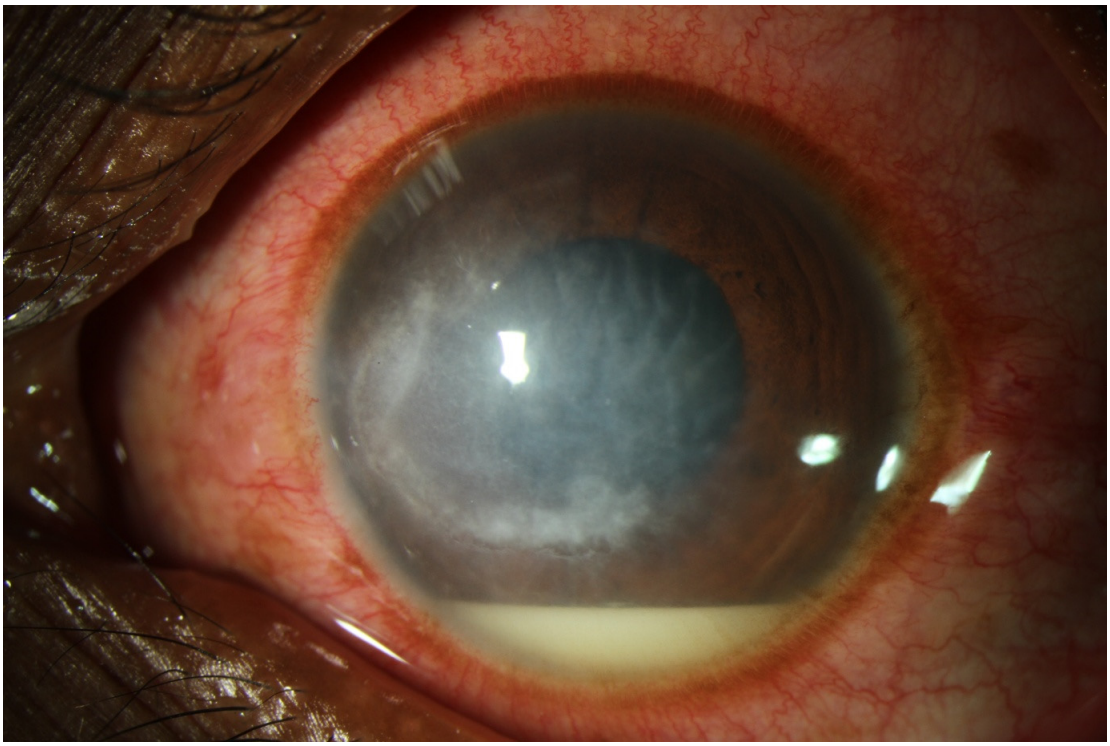


FIGURE 4: ENDOTHELIAL PLAQUE

FIGURE 5: PERFORATION

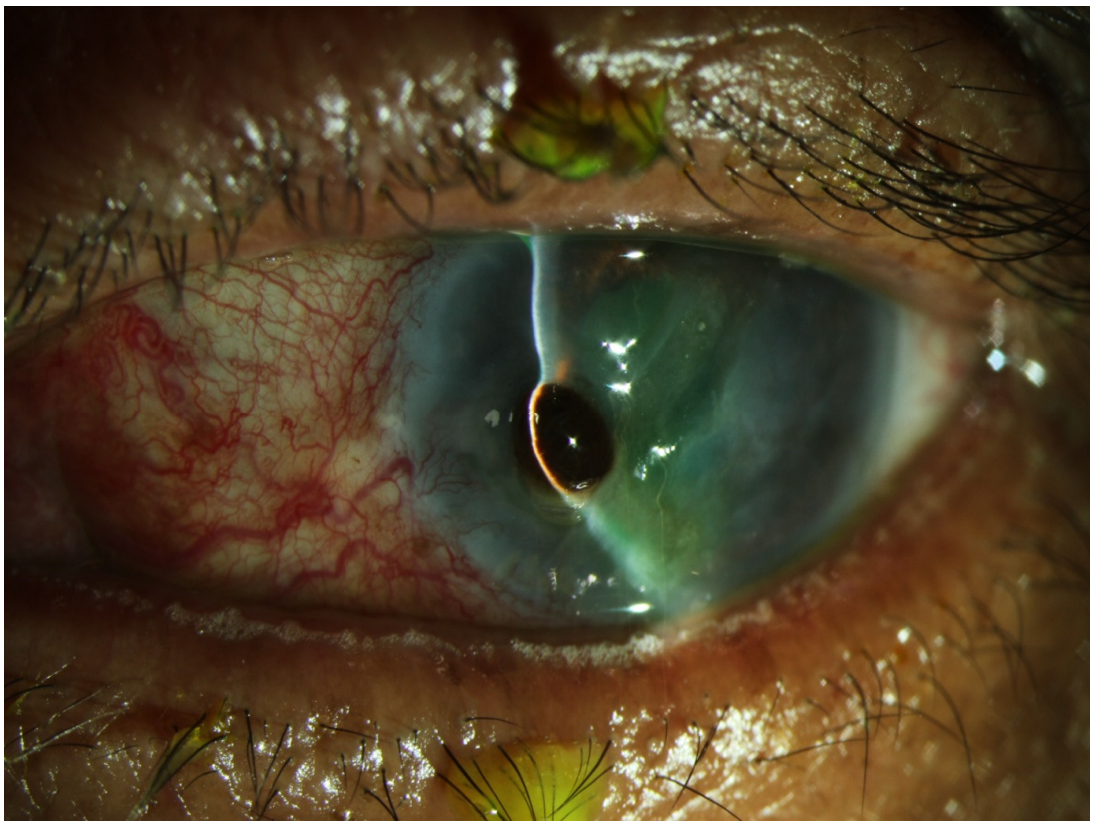


FIGURE 6: PERFORATION, AFTER FLUORESCEIN STAINING

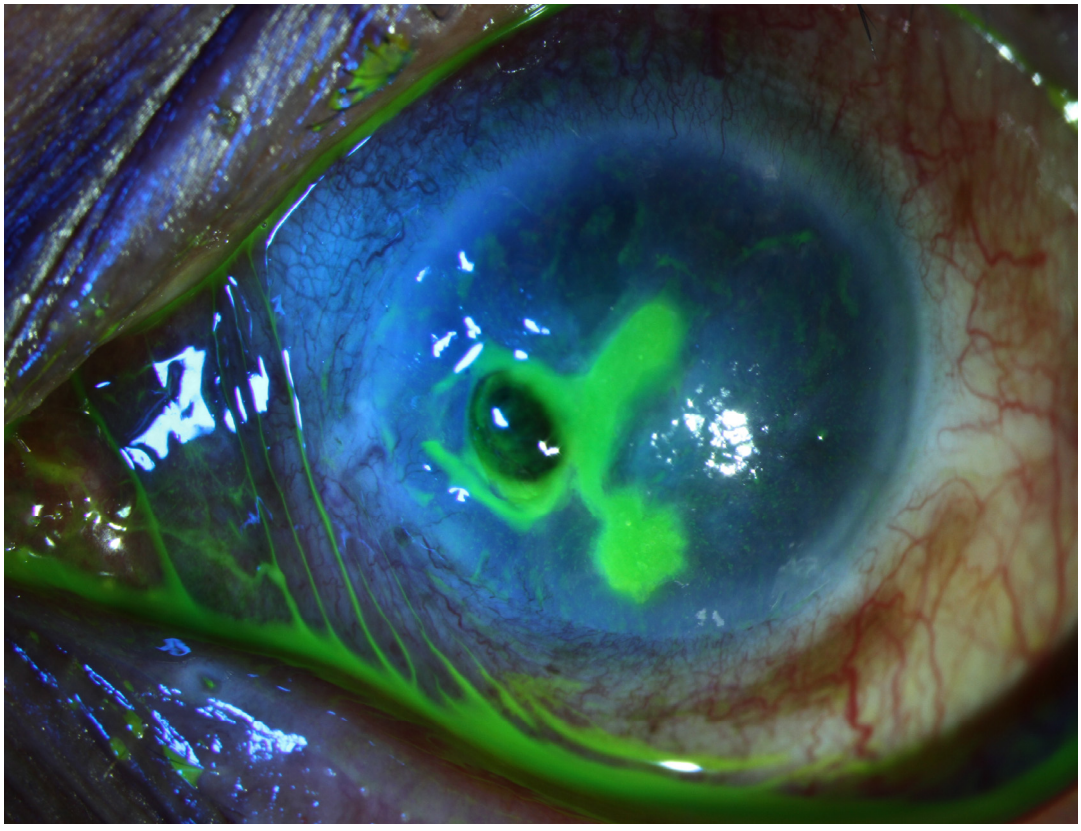


FIGURE 7: ULCER WITH LIMBAL INVOLVEMENT

FIGURE 8: POST THERAPEUTIC PENETRATING KERATOPLASTY

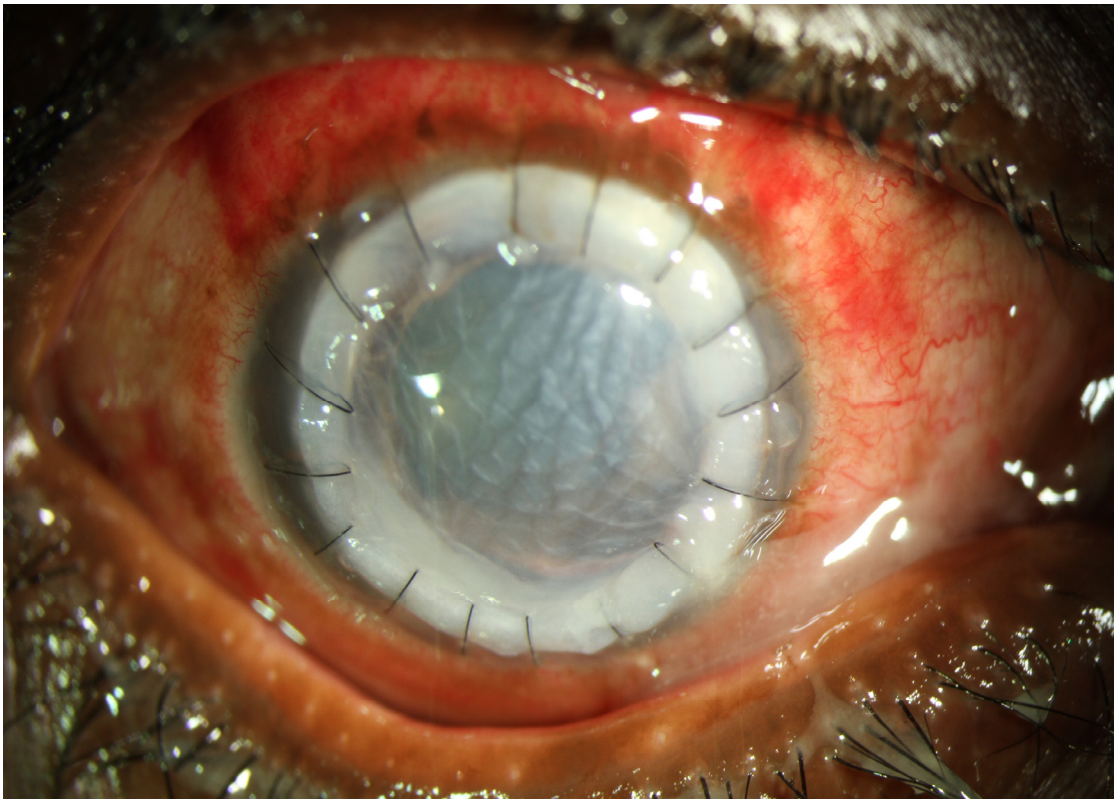


FIGURE 9: HEALED FUNGAL ULCER

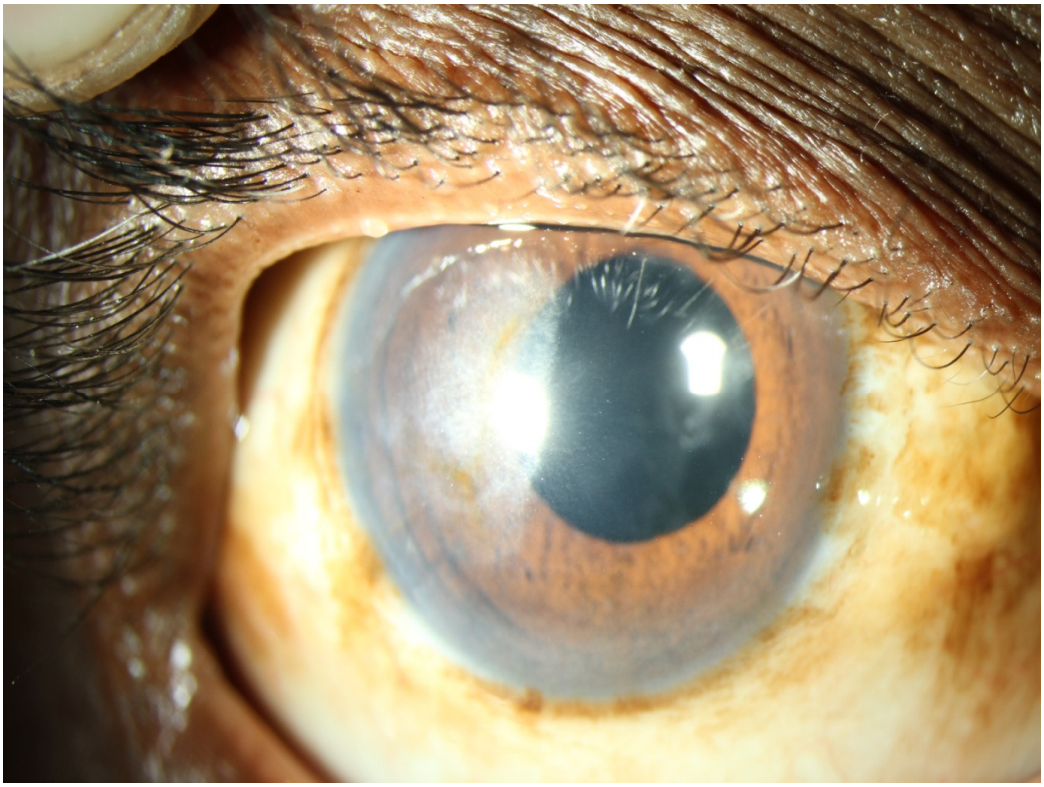
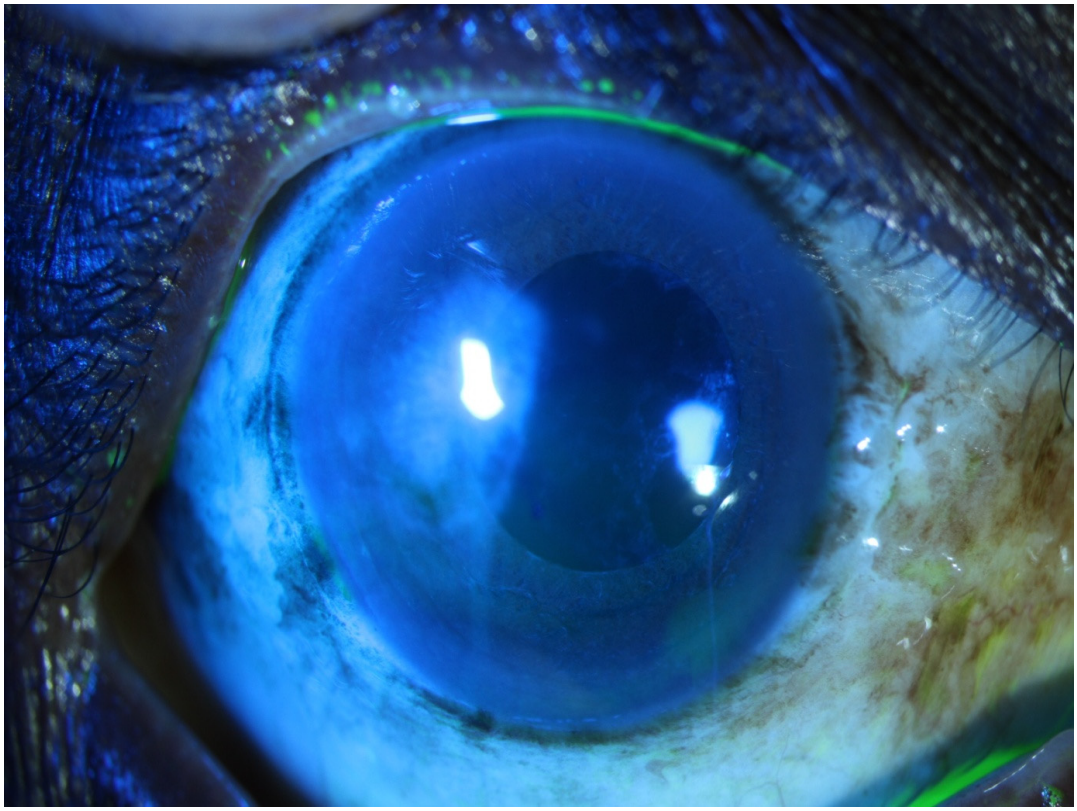


FIGURE 10: HEALED FUNGAL ULCER, AFTER FLUORESCEIN STAINING



RESULTS:

A total of 404 eyes of 404 patients were included in the study as per study protocol to compare the treatment outcomes following Fusarium and Aspergillus keratitis. This is a prospective study done at Aravind Eye Hospital, Madurai. Demographic profile of the patients included in the study is summarized below.

DEMOGRAPHIC CHARACTERISTICS:

AGE DISTRIBUTION:

The average age at presentation was 50.23 ± 9.95 years (1SD), minimum being 20 years and maximum being 70 years. A maximum number of 176 patients (43.56%) were between 51 to 60 years.

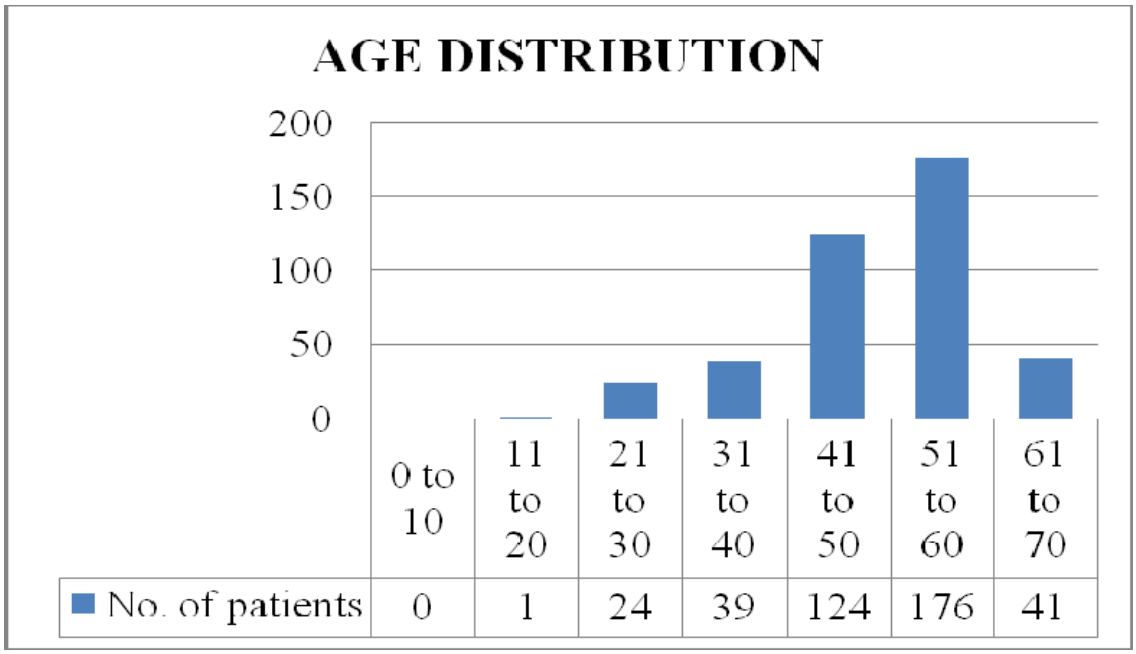
TABLE NO: 1

AGE IN YEARS	n	Mean (SD)	Min - Max
	404	50.23 (9.95)	20 - 70

TABLE NO: 2

AGE GROUP	n (%)
20 to 30 years	24 (5.94)
31 to 40 years	39 (9.65)
41 to 50 years	124 (30.69)
51 to 60 years	176 (43.56)
61 to 70 years	41 (10.15)
Total	404 (100)

GRAPH NO: 1



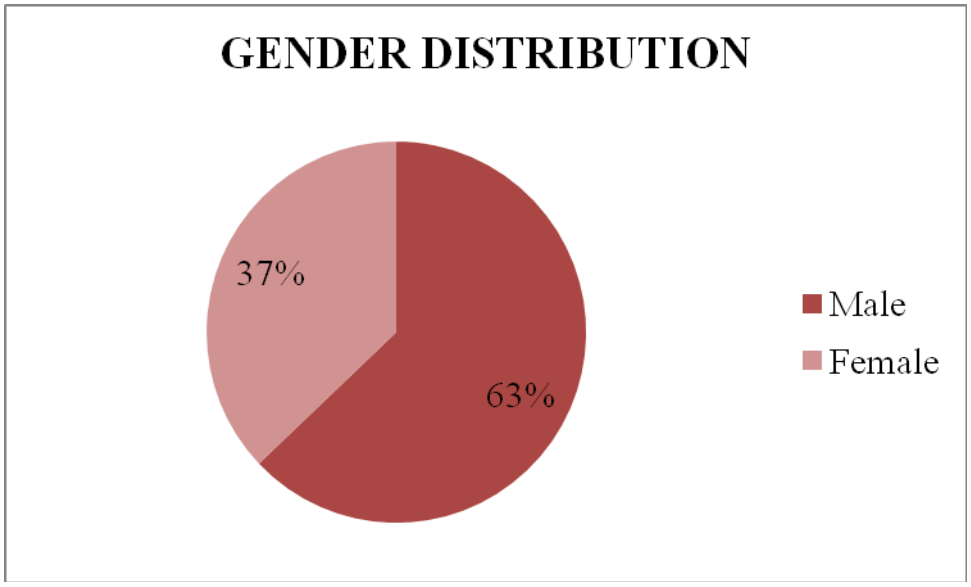
GENDER DISTRIBUTION:

Among the 404 patients in the study, 254 (62.87%) were males and 150 (37.13%) were females. This showed that there was a male preponderance.

TABLE NO: 3

GENDER	n (%)
Male	254 (62.87)
Female	150 (37.13)
Total	404 (100)

GRAPH NO: 2



OCCUPATION DISTRIBUTION:

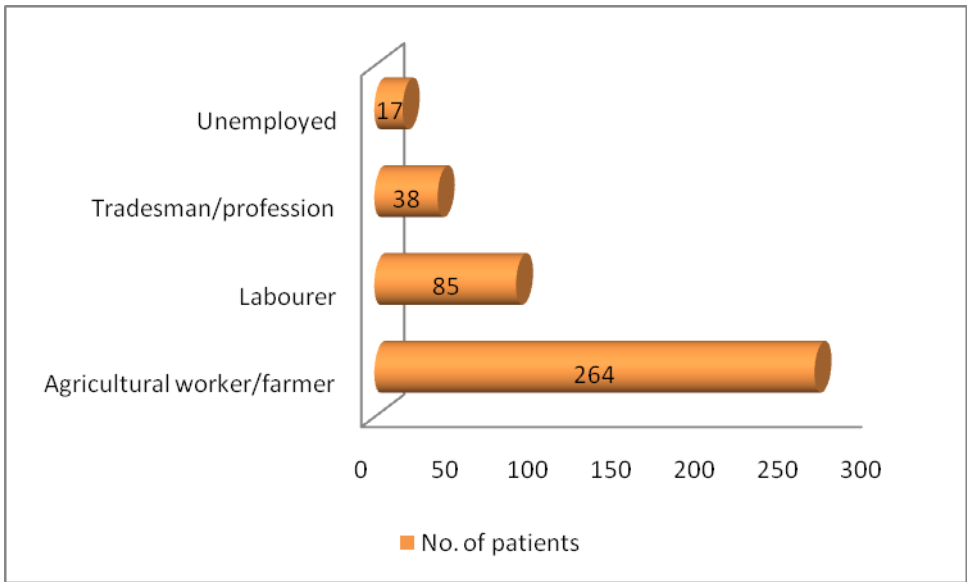
The occupational status of the 404 patients is shown in table No. 4. Of these, a majority of 264 (65.35%) patients were involved in agricultural work/ farming.

TABLE NO: 4

OCCUPATION	n (%)
Agricultural worker/farmer	264 (65.35)
Labourer*	85 (21.04)
Tradesman/profession€	38 (9.41)
Unemployed	17 (4.21)
Total	404 (100)

*An individual who does heavy manual labour, lifting, loading, and carrying of materials usually balanced on the head.
€Includes mechanics, stone masons, electricians and welders. Also includes professions such as police, office workers, factory workers and drivers.

GRAPH NO: 3



AGENT CAUSING TRAUMA:

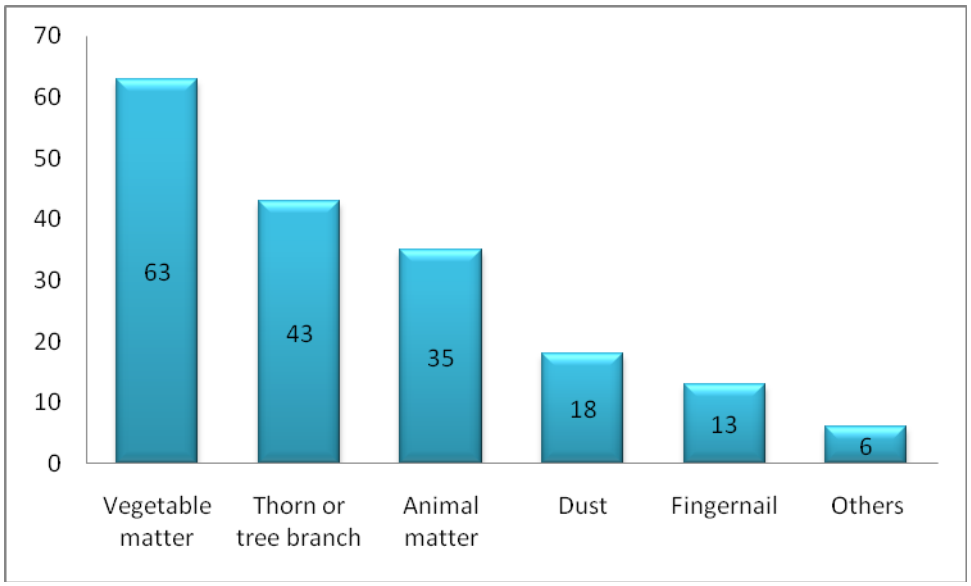
A recent history of injury to the affected eye was present in 178 (44.06%) eyes. The most common agent causing trauma was found to be vegetable matter in 63 (35.39%) eyes, followed by thorn or tree branch in 43 (24.16%) eyes and with animal matter in 35 (19.66%) eyes.

TABLE NO: 5

MODE OF TRAUMA	n (%)
Vegetable matter	63 (35.39)
Thorn or tree branch	43 (24.16)
Animal matter£	35 (19.66)
Dust	18 (10.11)
Fingernail	13 (7.30)
Others	6 (3.37)
Total	178 (100)

£Cow's tail, cow dung, insect.

GRAPH NO: 4



Out of the 264 patients employed in agricultural work/ farming, 114 (43.18%) patients had a history of trauma to the affected eye.

TABLE NO: 6

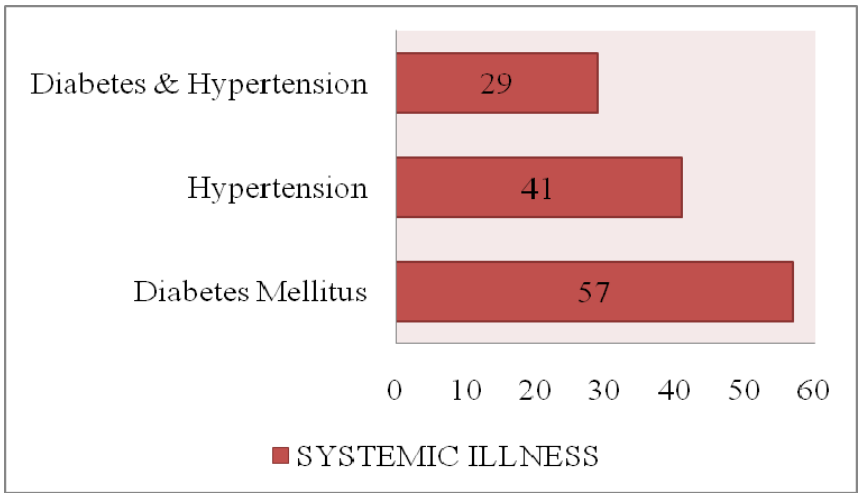
OCCUPATION	TRAUMA			P value [c]
	Yes n (%)	No n (%)	Total n (%)	
Agricultural worker/farmer	114 (43.18)	150 (56.82)	264 (100)	0.646
Labourer	38 (44.71)	47 (55.29)	85 (100)	
Tradesman/profession	16 (42.11)	22 (57.89)	38 (100)	
Unemployed	10 (58.82)	7 (41.18)	17 (100)	
Total	178 (44.06)	226 (55.94)	404	

C – Chi square test

SYSTEMIC DISEASE ASSOCIATION:

Of the 404 patients, 127 (31.44%) patients had an underlying systemic disease, amongst which 86 (67.72%) patients were diabetics.

GRAPH NO: 5



PRIOR NATIVE TREATMENT:

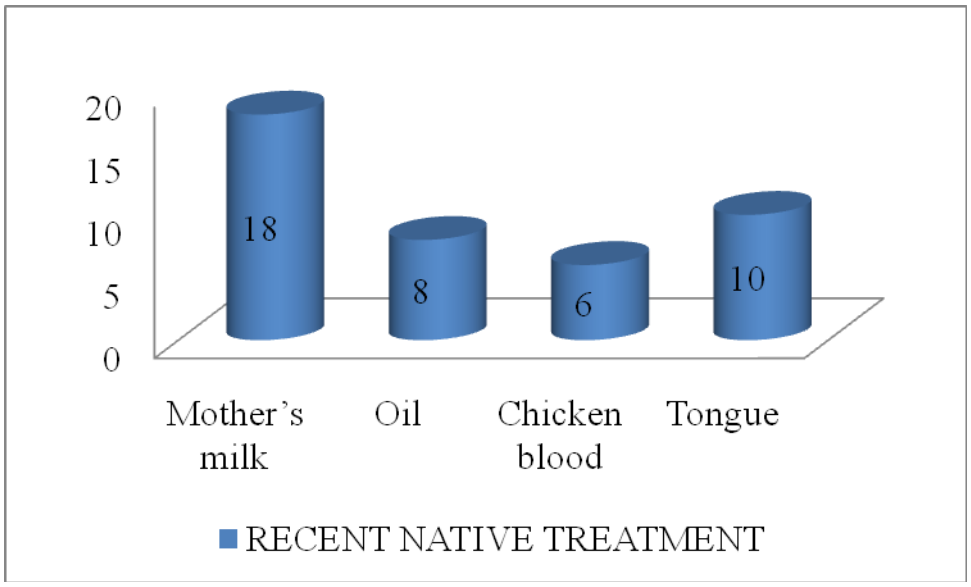
Inappropriate native medications were applied in 42 (10.40%) eyes prior to presentation, mostly being mother's milk application in 18 (4.46%) eyes.

TABLE NO: 7

RECENT NATIVE MEDICATIONS	**n (%)**
Mother's milk	18 (4.46)
Oil¥	8 (1.98)
Chicken blood	6 (1.48)
Tongue	10 (2.48)
Nil	362 (89.60)
Total	404 (100)

¥ castor oil/ seed oil

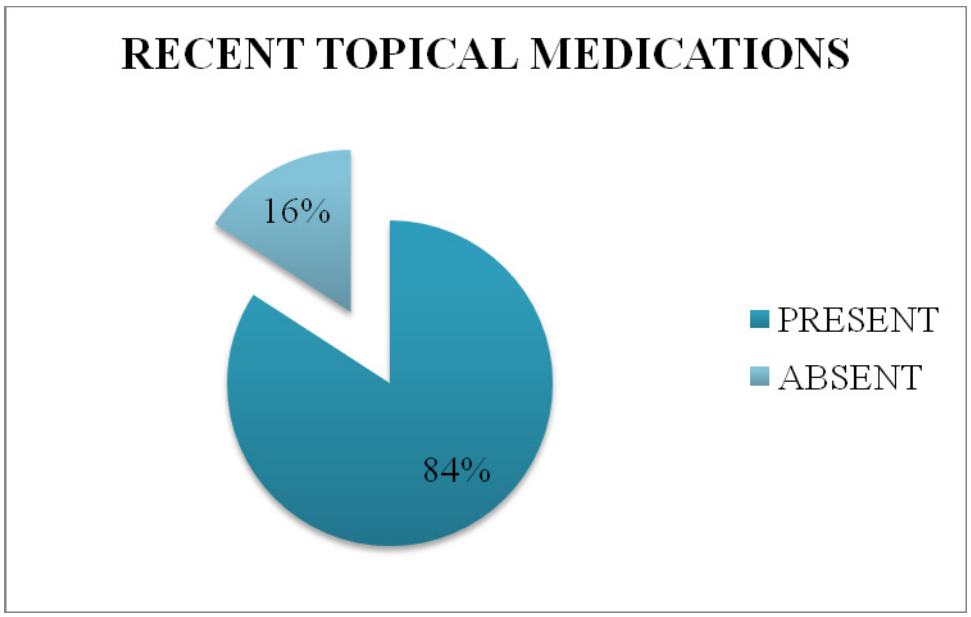
GRAPH NO: 6



PRIOR MEDICATION USAGE:

Preceding their initial visit to our hospital, 340 (84.16%) patients had applied topical medications in the form of antifungal, antibacterial and/or steroids, either alone or in combination.

GRAPH NO: 7



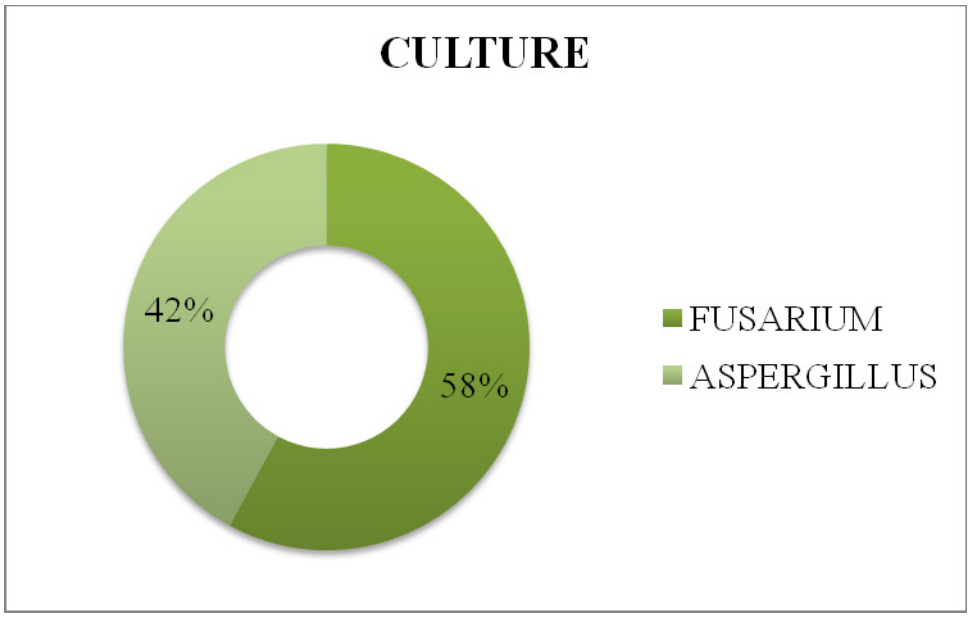
MICROBIOLOGICAL FINDINGS:

Among the 404 patients in the study, 234 (57.92%) patients had positive culture for Fusasium species and 170 (42.08%) patients were found to be culture positive for Aspergillus species.

TABLE NO: 8

CULTURE	n (%)
Fusarium	234 (57.92)
Aspergillus	170 (42.08)
Total	404 (100)

GRAPH NO: 8



CLINICAL CHARACTERISTICS:

VISUAL ACUITY:

The visual acuity at presentation of all 404 patients were analysed, the results are given below. The values ranged between 0.18 to 2.9 logarithm of the minimum angle of resolution (logMAR) units with a mean value of logMAR 1.09 ± 0.67 (1SD) units.

TABLE NO: 9

VISUAL ACUITY (logMAR)	n	Mean (SD)	Min – Max
Initial VA	404	1.09 (0.67)	0.18 – 2.9

ULCER CHARACTERISTICS:

ULCER SIZE:

The ulcer size of all 404 patients measured at the initial presentation showed a minimum size of 1 mm^2 and maximum size of 64 mm^2 with a mean value of 10.91 mm^2 ± 10.15 mm^2 (1SD).

TABLE NO: 10

Parameter	n	Mean (SD)	Min – Max
Initial ulcer size	404	10.91 (10.15)	1 – 64

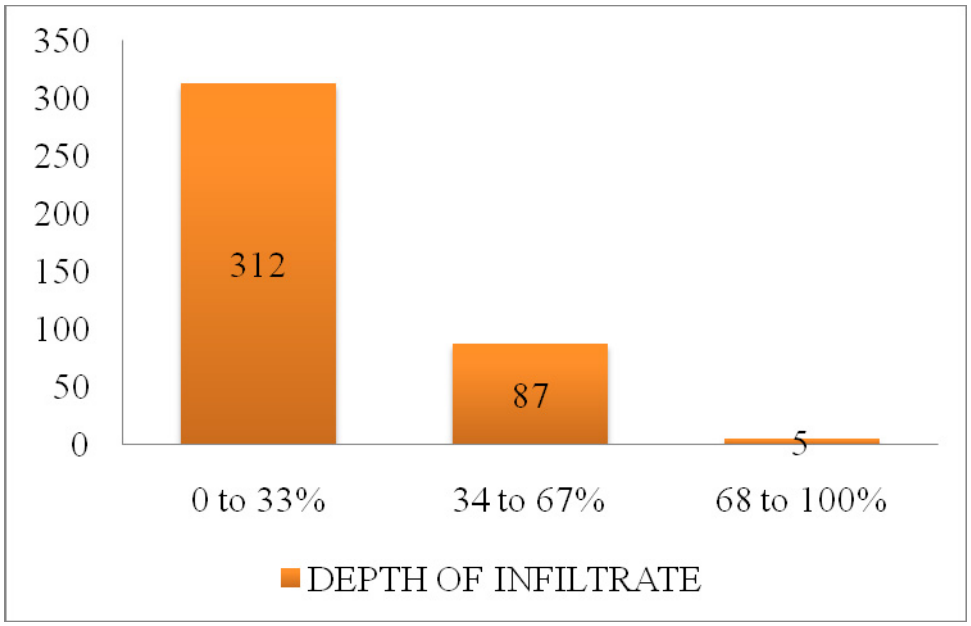
DEPTH OF THE ULCER:

Of the 404 patients, 312 (77.23%) patients had an ulcer depth of less than or equal to 33%. 87 (21.53%) patients had a much deeper ulcer measuring between 34 to 67%, whereas 5 (1.24%) patients had an ulcer depth measuring between 68 to 100%.

TABLE NO: 11

DEPTH OF INFILTRATE	n (%)
0 to 33 %	312 (77.23)
34 to 67 %	87 (21.53)
68 to 100 %	5 (1.24)
Total	404 (100)

GRAPH NO: 9



The depth of the ulcer of 404 patients was compared with the causative micro-organism. Among the 87 eyes who presented with a 34 to 67% of depth involvement, 49 (56.32%) were due to Aspergillus species. However, 4 (80%) out of 5 cases with 68 to 100% depth involvement were due to Fusarium species. The above results are statistically significant (p value <0.05).

TABLE NO: 12

Depth of Infiltrate	**Culture Organism**			**P value [f]**
	Fusarium n (%)	**Aspergillus n (%)**	**Total n (%)**	
0 to 33 %	192 (61.54)	120 (38.46)	312 (100)	0.005
34 to 67 %	38 (43.68)	49 (56.32)	87 (100)	
68 to 100 %	4 (80.00)	1 (20.00)	5 (100)	
Total	234 (57.92)	170 (42.08)	404	

F – Fisher's exact test

The influence of recent topical medications over the depth of the ulcer was analysed.

TABLE NO: 13

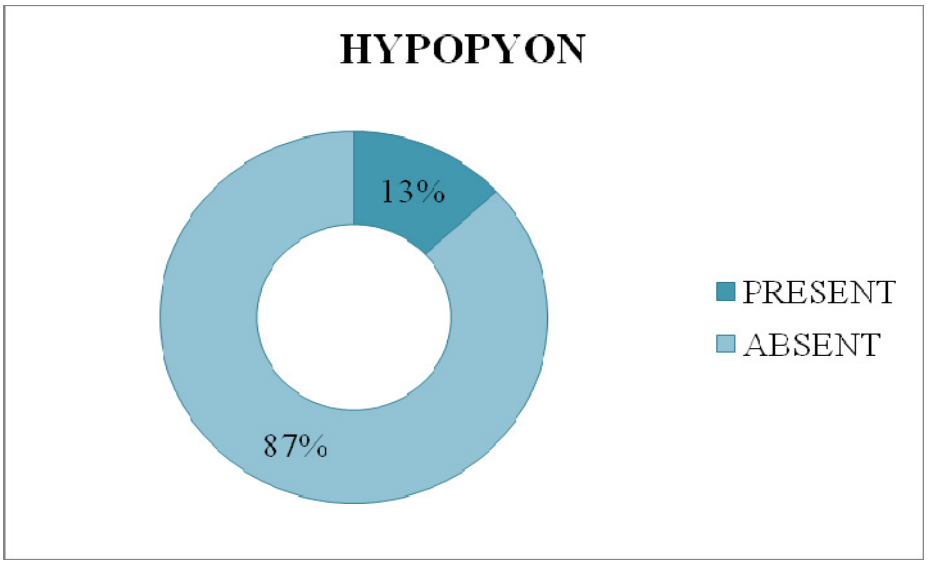
Depth of infiltrate	**Recent topical medication**			**P value [f]**
	Yes n (%)	**No n (%)**	**Total**	
0 to 33 %	258 (82.69)	54 (17.31)	312 (100)	0.357
34 to 67 %	77 (88.51)	10 (11.49)	87 (100)	
68 to 100 %	5 (100)	-	5 (100)	
Total	340 (84.16)	64 (15.84)	404	

F – Fisher's exact test

PRESENCE OF HYPOPYON:

Hypopyon was noted in 53 (13.12%) eyes.

GRAPH NO: 10



The presence or absence of hypopyon was analysed in relation to the causative micro-organism. Among the 53 eyes which presented with a hypopyon, 32 (60.38%) were due to Aspergillus species and 21 (39.62%) were due to Fusarium species. The results were statistically significant (p value <0.05).

TABLE NO: 14

Culture	**Hypopyon n(%)**			**P value[c]**
	Yes	**No**	**Total**	
Fusarium	21 (8.97)	213 (91.03)	234 (100)	0.004
Aspergillus	32 (18.82)	138 (81.18)	170 (100)	
Total	53 (13.12)	351 (86.88)	404 (100)	

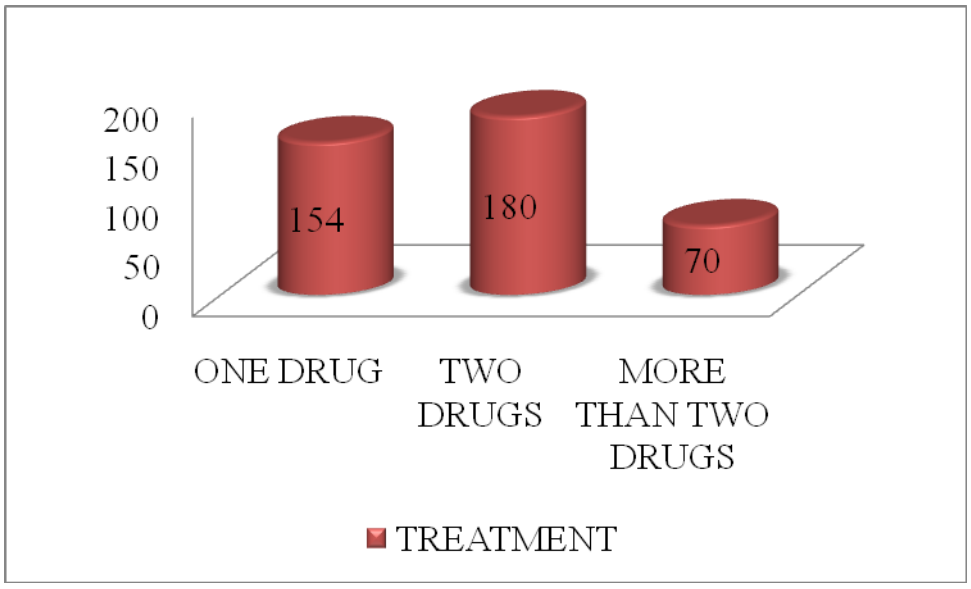
C – Chi square test

TREATMENT ANALYSIS:

All the 404 patients enrolled in the study were treated with topical antifungal medications and topical cycloplegics. The patients either received 5% natamycin as monotherapy or in combination with the above mentioned antifungal medications.

Among the 404 patients, 154 (38.12%) patients were started on 5% Natamycin only, 180 (44.55%) patients received a combination of two drugs and 70 (17.33%) patients received more than two antifungal medications.

GRAPH NO: 11



One drug: 5% Natamycin
Two drugs: 5% Natamycin + 1% Voriconazole or 5% Natamycin + 1% Itraconazole
More than two drugs: Combination of above drugs

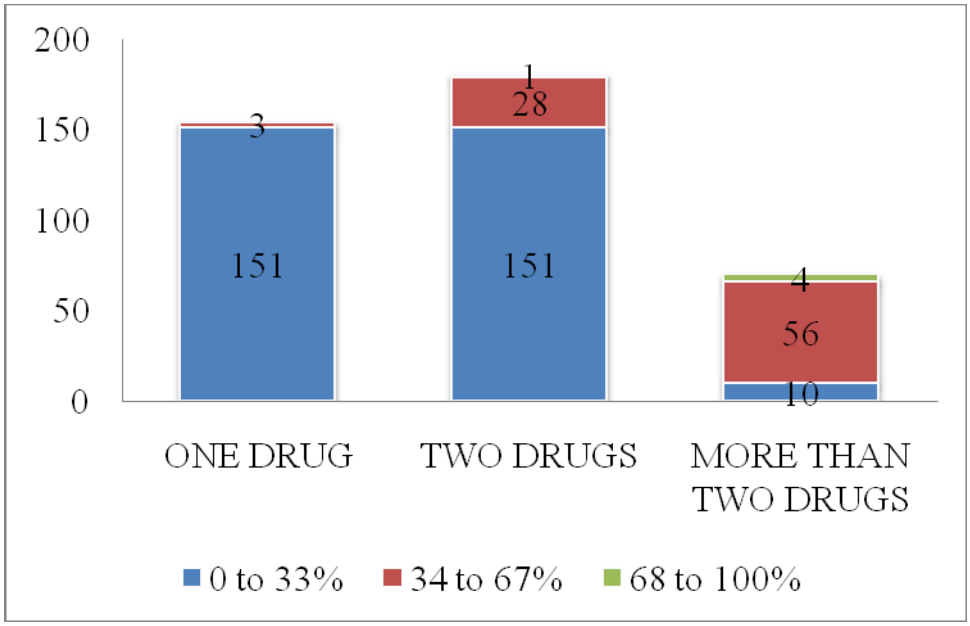
Among the 312 ulcers with less than or equal to 33% depth involvement, 151 (48.40%) patients received only one drug (5% Natamycin), another 151 (48.40%) patients received two drugs. Among the 87 ulcers with 34 to 67% depth involvement, 28 (32.18%) patients received two drugs and 56 (64.37%) patients received more than two drugs. Of the 5 deep ulcers with 68 to 100% depth involvement, 4 (80%) patients received more than two drugs. The results were statistically significant (p value <0.05).

TABLE NO: 15

Depth of Infiltrate	**Drugs**				**P value[f]**
	One drug n (%)	**Two drugs n (%)**	**More than two drugs n (%)**	**Total n (%)**	
0 to 33 %	151 (48.40)	151 (48.40)	10 (3.21)	312 (100)	<0.001
34 to 67 %	3 (3.45)	28 (32.18)	56 (64.37)	87 (100)	
68 to 100 %	-	1 (20.00)	4 (80.00)	5 (100)	
Total	154 (38.12)	180 (44.55)	70 (17.33)	404	

F – Fisher's exact test

GRAPH NO: 12



VISUAL ACUITY:

The best corrected visual acuity (BCVA) at 3 months of all 404 patients were analysed, the results are given below. The values ranged between 0 to 2.9 logMAR units, with an average of LogMAR 0.85 ± 0.80 (1SD) units.

TABLE NO: 16

VISUAL ACUITY (LogMAR)	n	Mean (SD)	Min – Max
BCVA at 3 months	404	0.85 (0.80)	0 – 2.9

The initial visual acuity measured using Snellen's chart at 6 meters were compared with the best corrected visual acuity at 3 months and the

details are given in the table below. The results were statistically significant (p value <0.05).

TABLE NO: 17

VISUAL ACUITY (logMAR)	n	Mean (SD)	Min – Max	P value*
Initial VA	404	1.09 (0.67)	0.18 – 2.9	< 0.01
BCVA at 3 months	404	0.85 (0.80)	0 – 2.9	

*Wilcoxon sign rank test

The BCVA of patients at 3 months was compared between the Fusarium and the Aspergillus group. The final BCVA among the Fusarium group was better than the Aspergillus group, however there was no statistically significant difference between the groups.

TABLE NO: 18

CULTURE	BCVA at 3 months			
	n	Mean (SD)	Min – Max	P value^
Fusarium	234	0.75 (0.68)	0 – 2.9	0.107
Aspergillus	170	0.98 (0.92)	0 – 2.9	

^Mann Whitney U test

TIME TO RE- EPITHELIALIZATION:

Of the 404 patients, ulcers of 28 (6.93%) patients had healed at the end of 3 weeks.

TABLE NO: 19

IMPRESSION AT 3 WEEKS	n (%)
Healed	28 (6.93)
Healing	295 (73.02)
Remained same	45 (11.14)
Worsened	36 (8.91)
Total	404

Among the 28 patients, 15 (53.57%) ulcers were due to Fusarium species and 13 (46.43%) ulcers were due to Aspergillus species.

TABLE NO: 20

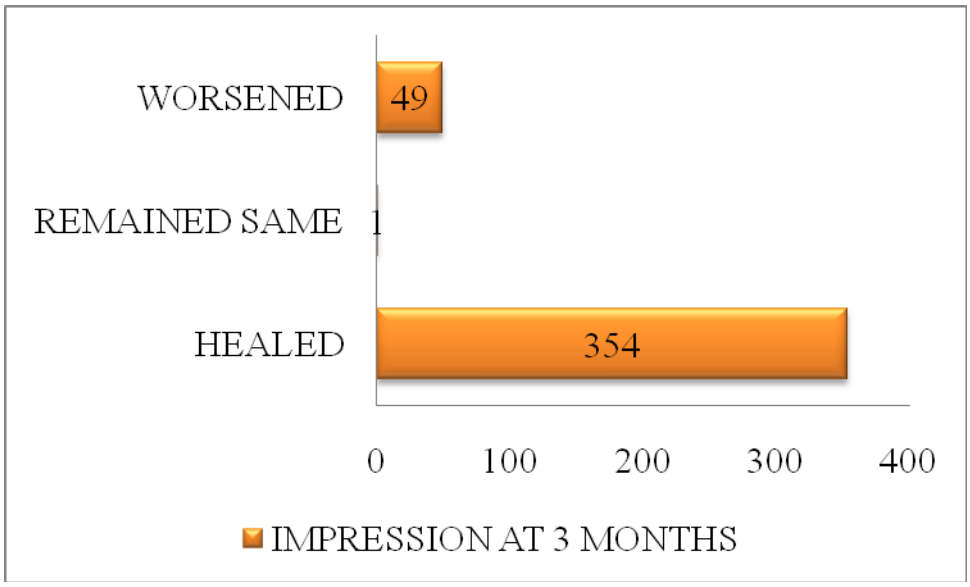
HEALED ULCERS	n (%)	CULTURE
At 3 weeks	15 (53.57)	Fusarium
	13 (46.43)	Aspergillus
Total	28 (100)	

At 3 months follow up the final end point was analysed. A total of 354 (87.62%) ulcers had healed, 1 (0.25) ulcer remained same and 49 (12.13%) ulcers had worsened.

TABLE NO: 21

IMPRESSION AT 3 MONTHS	n (%)
Healed	354 (87.62)
Remained same	1 (0.25)
Worsened	49 (12.13)
Total	404 (100)

GRAPH NO: 13



The final end point of the 404 patients was compared with the depth of infiltrate at presentation. Among the 354 healed ulcers, 310 (87.57%) patients had ulcers with less than or equal to 33% depth involvement. Among the 49 ulcers that had worsened, 42 (85.71%) ulcers had 34 to 67% depth involvement and 5 (10.20%) ulcers had 68 to100% depth involvement. The results were statistically significant (p value <0.05).

TABLE NO: 22

END POINT	DEPTH OF INFILTRATE				P value[f]
	0 to 33 % n (%)	34 to 67 % n (%)	68 to 100 % n (%)	Total	
Healed	310 (87.57)	44 (12.43)	-	354 (100)	< 0.001
Remained same	-	1 (100)	-	1 (100)	
Worsened	2 (4.08)	42 (85.71)	5 (10.20)	49 (100)	
Total	312 (77.23)	87 (21.53)	5 (1.24)	404	

F – Fisher's exact test

The final end point of the 404 patients was compared with the causative fungal micro-organism. Among the 354 healed ulcers, 218 (61.58%) of them belonged to the Fusarium group and 136 (38.42%) belonged to the Aspergillus group. Among the 49 ulcers that worsened, 16(32.65%) ulcers were due to Fusarium species and 33 (67.35%) ulcers were due to Aspergillus species. The results were statistically significant (p value <0.05).

TABLE NO: 23

END POINT	CULTURE			P value[f]
	Fusarium n (%)	Aspergillus n (%)	Total	
Healed	218 (61.58)	136 (38.42)	354 (100)	0.009
Remained same	-	1 (100)	1 (100)	
Worsened	16 (32.65)	33 (67.35)	49 (100)	
Total	234 (57.92)	170 (42.08)	404	

F – Fisher's exact test

SCAR SIZE:

The scar size of all 404 patients were measured at 3 months and it showed a minimum size of 1 mm^2 and maximum size of 36 mm^2 with a mean value of 4.46 mm^2 ± 6.08 mm^2 (1SD).

TABLE NO: 24

Parameter	n	Mean (SD)	Min – Max
Scar size at 3 months	404	4.46 (6.08)	1 – 36

The size of the ulcer at initial presentation was compared with the scar size at 3 months, the results were statistically significant (p value <0.05).

TABLE NO: 25

Parameter	n	Mean (SD)	Min – Max	P value@
Initial ulcer size	404	10.91 (10.15)	1 – 64	< 0.01
Final scar size	404	4.46 (6.08)	1 – 36	

@-Wilcoxon Sign rank test

The results of the final scar size at 3 months were compared between the causative fungal micro-organism. The mean scar size among the Fusarium species was 4.34 mm^2 ± 5.79 mm^2 and those among the Aspergillus species was 4.56 mm^2 ± 6.48 mm^2. The results were statistically significant (p value <0.05).

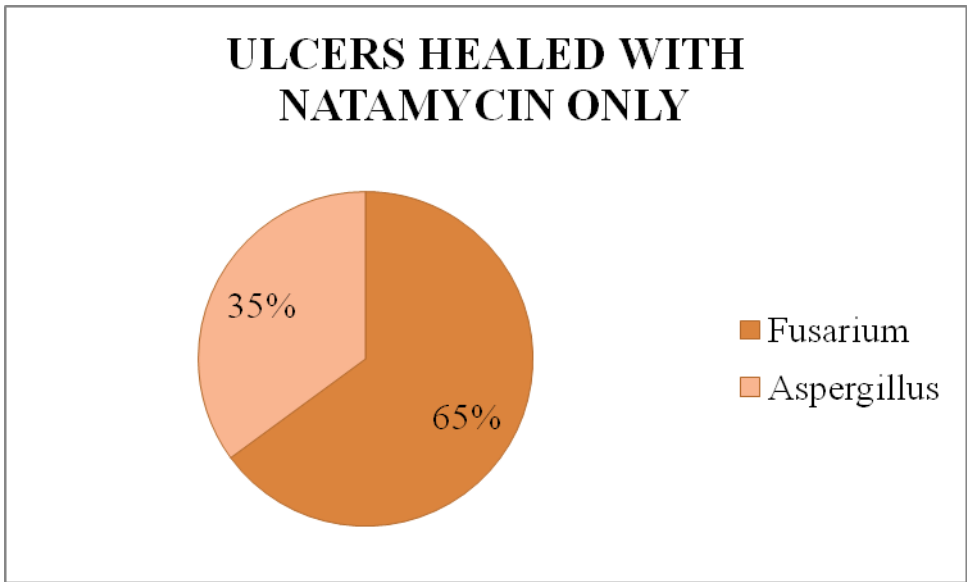
TABLE NO: 26

CULTURE	SCAR SIZE AT 3 MONTHS			
	n	Mean (SD)	Min – Max	P value^
Fusarium	234	4.34 (5.79)	0 – 36	0.039
Aspergillus	170	4.56 (6.48)	0 – 36	

ULCERS HEALED WITH MONOTHERAPY (NATAMYCIN):

Of the 404 patients, 154 (38.12%) of them healed with natamycin only, used as monotherapy. Among the 154 cases, 100 (64.94%) of them were due to Fusarium species, and 54 (35.06%) were due to Aspergillus species.

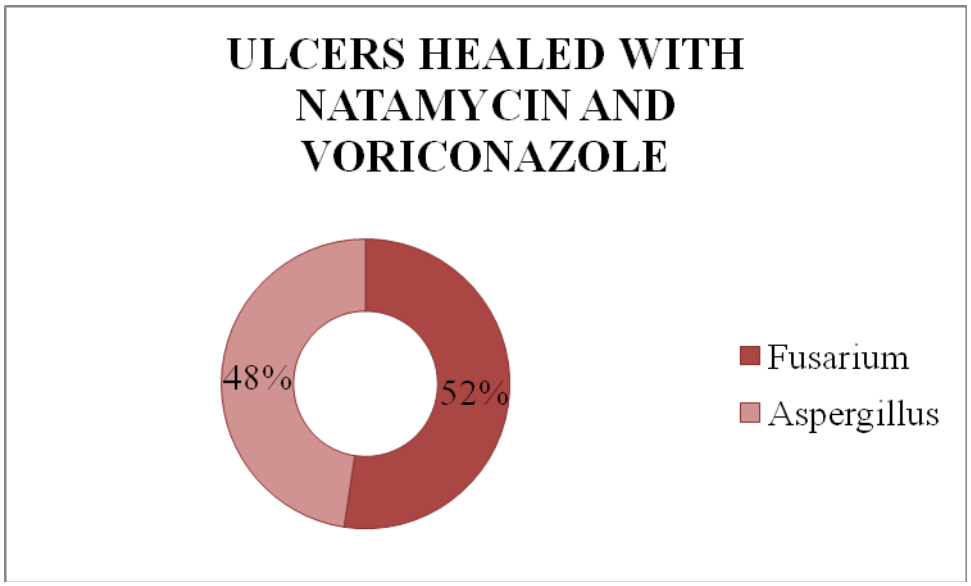
GRAPH NO: 14



Among the 180 patients who were started on two drugs at presentation, 175 (97.22%) patients healed and 5 (2.78%) patients did not. Among these 175 cases, 63 (36%) cases healed with a combination of natamycin and voriconazole, 112 (64%) cases healed with a combination of natamycin and itraconazole.

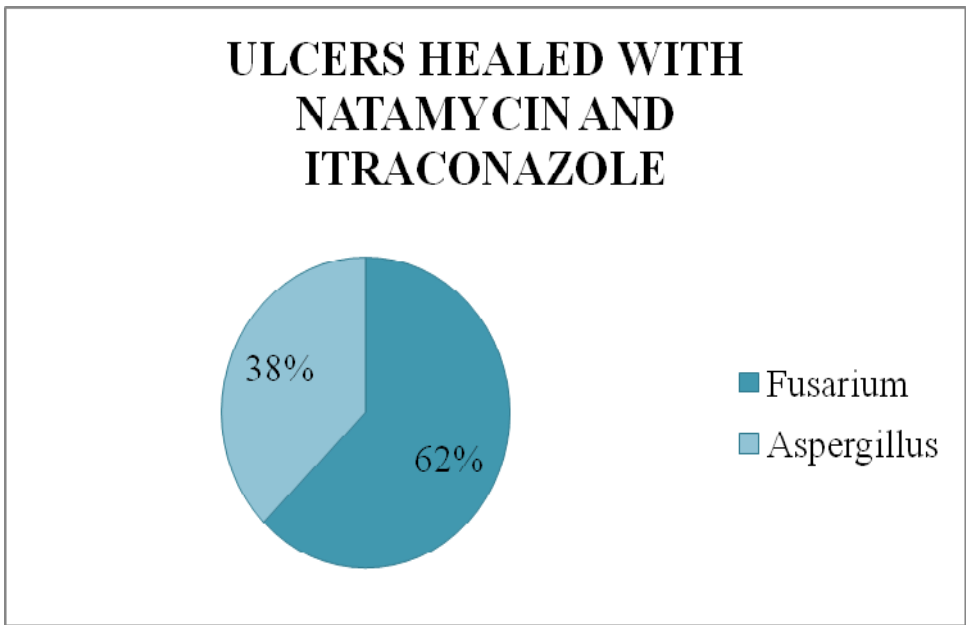
Among the 63 cases that healed with a combination of natamycin and voriconazole, 33 (52.38%) cases were due to Fusarium species and 30 (47.62%) cases were due to Aspergillus species.

GRAPH NO: 15



Among the 112 cases that healed with a combination of natamycin and itraconazole, 70 (62.50%) cases were due to Fusarium species and 42 (37.50%) cases were due to Aspergillus species.

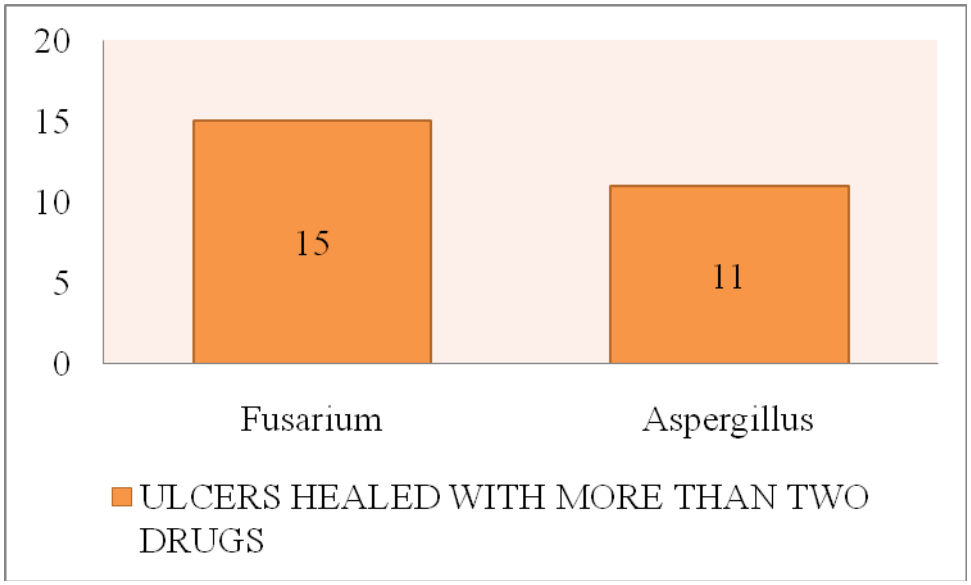
GRAPH NO: 16



Among the 70 patients who were started on more than two drugs at presentation, 26 (37.14%) cases healed whereas 44 (62.86%) cases did not.

Among the 26 cases that healed with more than two drugs, 15 (57.69%) cases were due to Fusarium species and 11 (42.31%) cases were due to Aspergillus species.

GRAPH NO: 17



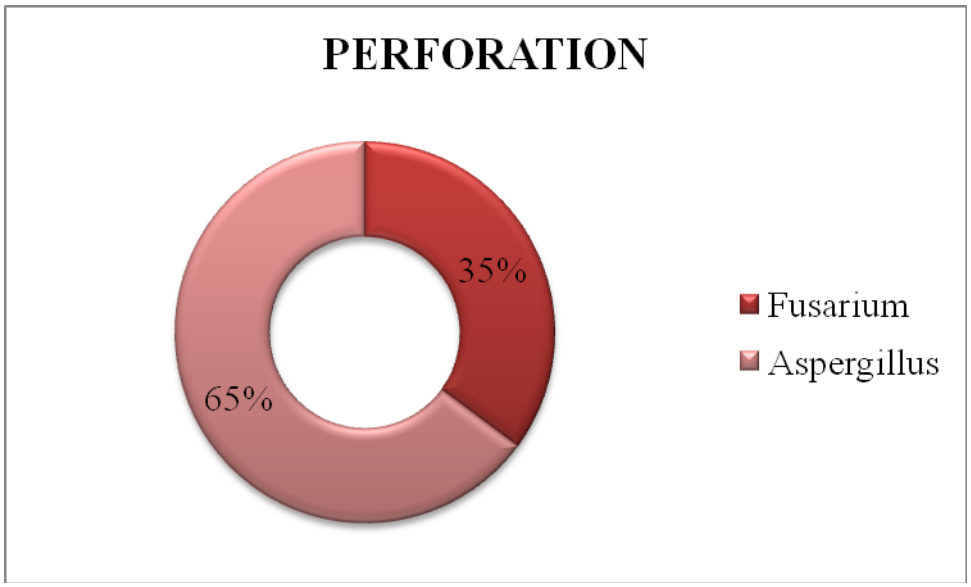
NON EFFECTIVE TREATMENT CAUSES:

Perforation, impending perforation and worsening of ulcer were considered as causes of non effective treatment. They subsequently underwent therapeutic penetrating keratoplasty.

PERFORATION:

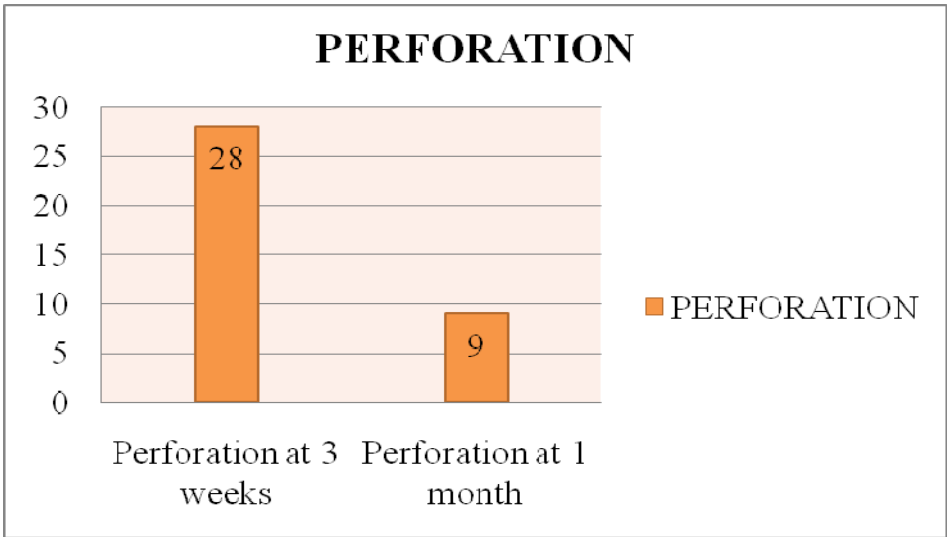
Among the 404 patients, 37 (9.16%) patients developed corneal perforation secondary to the fungal keratitis, among which 13 (35.14%) were due to Fusarium species and 24 (64.86%) were due to Aspergillus species.

GRAPH NO: 18



Among the 37 cases which perforated, 28 (75.68%) of them happened at 3 weeks follow up and an additional 9 (24.32%) cases perforated at 1month follow up.

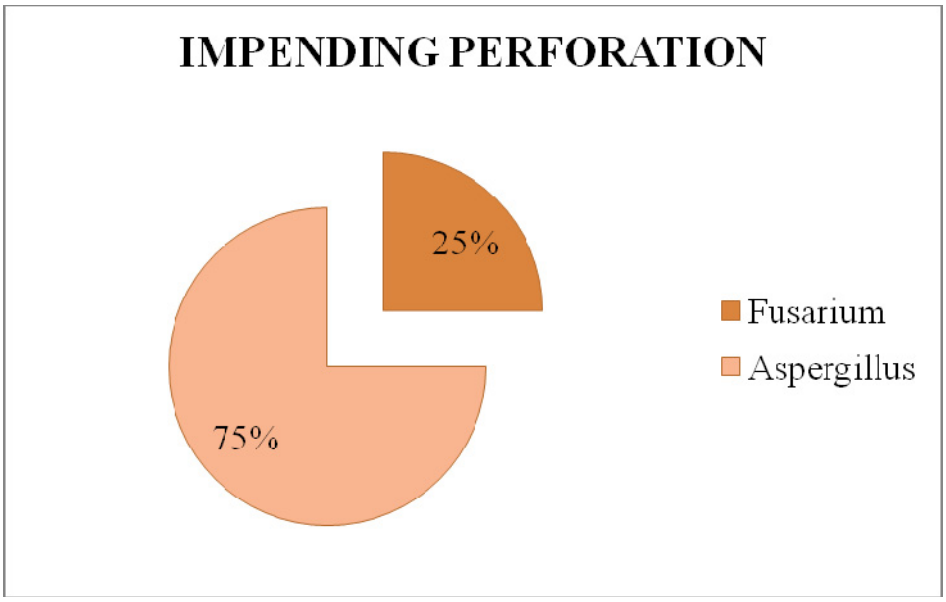
GRAPH NO: 19



IMPENDING PERFORATION:

Among the 404 patients, 8 (1.98%) patients developed impending corneal perforation secondary to the fungal keratitis, among which 2 (25%) were due to Fusarium species and 6 (75%) were due to Aspergillus species.

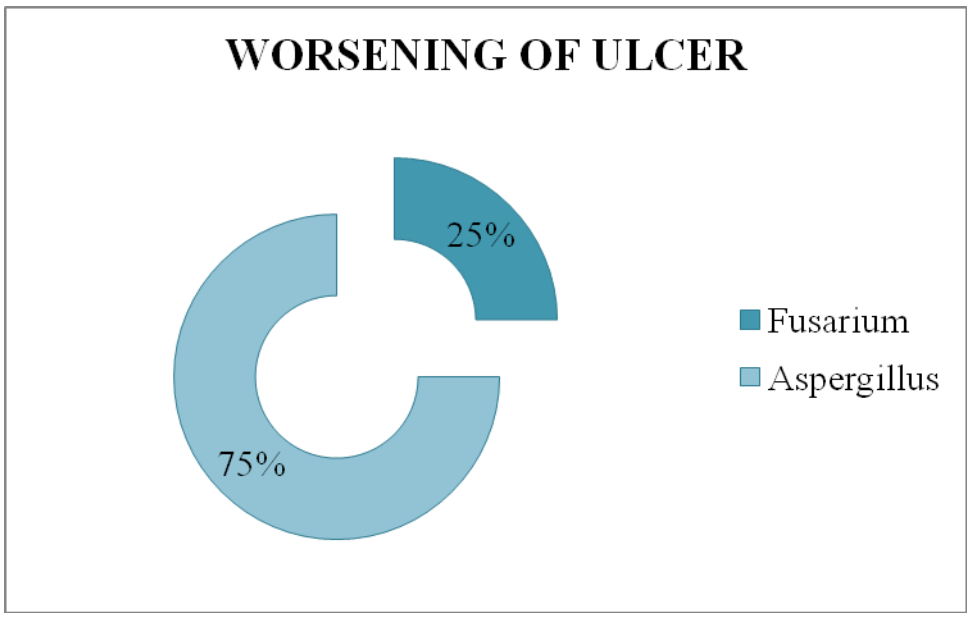
GRAPH NO: 20



WORSENING OF ULCER:

Among the 404 patients, 4 (0.99%) ulcers had worsened, among which 1 (25%) were due to Fusarium species and 3 (75%) were due to Aspergillus species.

GRAPH NO: 21



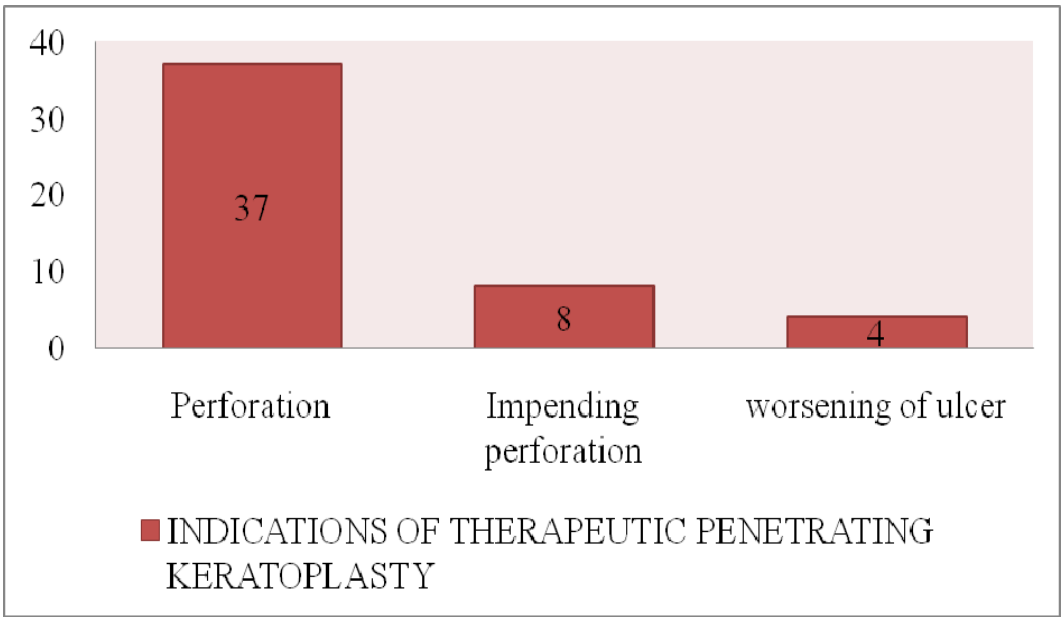
THERAPEUTIC PENETRATING KERATOPLASTY:

Of the 404 patients, therapeutic penetrating keratoplasty was done in 49 (12.13%) patients.

INDICATIONS:

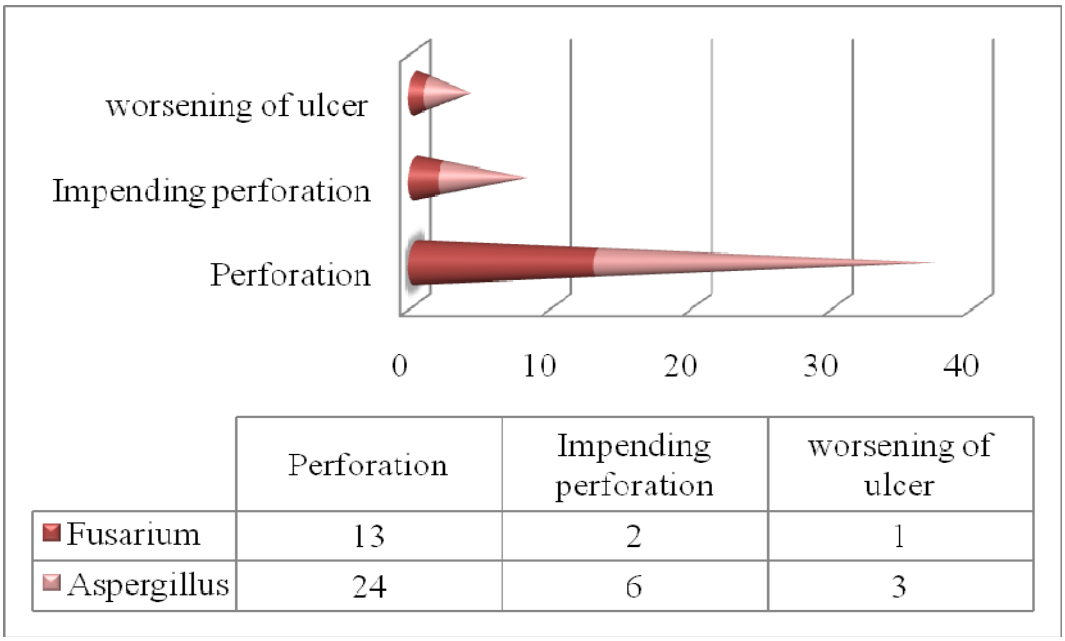
Among the 49 patients who underwent TPK, 37 (75.51%) of them was done due to perforation, 8 (16.33%) cases due to impending perforation and 4 (8.16%) cases due to worsening of the ulcer.

GRAPH NO: 22



The distribution of causative fungal pathogen and need for therapeutic penetrating keratoplasty has been described in the table given below.

GRAPH NO: 23



	Perforation	Impending perforation	worsening of ulcer
Fusarium	13	2	1
Aspergillus	24	6	3

DISCUSSION:

Mycotic keratitis remains a challenging and often elusive diagnosis in most geographic regions, especially endemic regions. Corneal infections due to fungi can be more virulent and damaging compared to that of bacteria. Corneal ulcers secondary to fungal infection are more likely to perforate the cornea than bacterial keratitis.

Fusarium species and Aspergillus species are the most commonly reported fungal micro-organisms isolated from cases of fungal keratitis in the tropical countries. In both Ghana and south India the most commonly isolated fungal pathogens were Fusarium species. Fusarium species have also been found to be the principal fungal micro-organism in Florida, Paraguay, Nigeria, Tanzania, Hong Kong and Singapore. Aspergillus species predominate in northern India, Nepal, and Bangladesh. [3]

Delays in diagnosis, sparse availability of antifungal medications and the hazardous sequelae of corneal fungal infections alter the course and outcome of the disease. Recent studies and advances in the specialty have broadened the approach and treatment of mycotic keratitis.

Our study is designed to compare the treatment outcomes following Fusarium and Aspergillus keratitis in a tertiary eye care centre.

A total of 404 patients were enrolled in the study, over a period of 1 year. After careful clinical examination and appropriate microbiological diagnosis, patients were treated with antifungal medications. Among the

404 eyes, the mean age of patients was found to be 50.23 years in our study, (SD 9.95, range 20–70 years), with 43.56% of patients in the age group of 51 to 60 years. A study by Xie et al [7], showed almost one third of the patients (203) were in the age group of 41 to 50 years. A study by Chowdhary et al [10], showed the most commonly involved group to be between 31 to 40 years.

In our study, 254 (62.87%) were males and 150 (37.13%) were females. A study by Xie et al [7], showed males (60.6%) were more likely to be affected by fungal keratitis than females (39.4%). A study by Chowdhary et al [10], showed 130 (68%) were males and 61 (32%) were females. Another study of 434 patients by Srinivasan et al [2], showed 266 (61.3%) were males and 168 were females (38.7%).

In our study, 264 (65.35%) patients were involved in agricultural work/ farming. A study by Srinivasan et al [2], showed that 245 (56.4%) patients were involved in agricultural work/ farming.

Ocular trauma is a major predisposing factor for fungal keratitis and most cases are reported from developing countries such as India and Ghana. The percentage of corneal trauma has been reported to be as high as 66% by Srinivasan et al [2] and as low as 8% by Tanure et al [61]. In our study a history of antecedent trauma to the affected eye was present in 178 eyes (44.06%). The most common agent causing trauma was found to be vegetative matter in 63 (35.39%) eyes. In a study by Chowdhary et

al [10], a history of prior injury to the cornea was noted in 63/150 cases (42%), with agricultural products in 33 (52.38%) eyes. In a study by Xie et al [7], corneal trauma was noted in 51.4% of patients, especially injury from plants (25.7%). In another study by Basak et al [17], a history of recent corneal injury was present in 994 (82.9%) patients, 715 (59.6%) patients had corneal injury with vegetative matter; mostly (526; 43.9%) paddy or paddy stalk.

It is of interest that 42 (10.40%) of the total of 404 patients were recently exposed to some kind of native topical medication before initial presentation, mostly mother's milk application in 18 (4.46%) eyes. In a study by Srinivasan et al [2], 162 patients had applied prior native topical medication, mostly mother's milk being applied in 42 (25.93%) eyes.

Preceding their initial visit to our hospital, 340 (84.16%) patients had applied topical medications in the form of antifungal, antibacterial and/or steroids, either alone or in combination. In a study by Srinivasan et al [2], 376 (86. 64%) patients had applied similar topical medications prior to presentation.

In our study, 127 (31.44%) patients had an underlying systemic disease, amongst which 86 (67.72%) patients were diabetics.

In our study, 53 (13.12%) eyes presented with a hypopyon, 32 (60.38%) were due to Aspergillus species and 21 (39.62%) were due to

Fusarium species. In a study by Srinivasan et al [2], 232 patients (53.5%) had a hypopyon at presentation.

Among the 404 patients in our study, 234 (57.92%) patients had positive culture for Fusasium species and 170 (42.08%) patients were found to be culture positive for Aspergillus species. In a study by Srinivasan et al [2], 73 (47.1%) patients were due to Fusarium species and 25(16.1%) were due to Aspergillus species. In a study by Chowdhary et al [10], a diagnosis of mycotic keratitis was established in 191 (39%) cases out of the total study group of 485 cases. The spectrum of fungal isolates included were Aspergillus species in 78 (40.8%) cases followed by Curvularia species in 55 (28.6%) cases. In a study by Basak et al [17], 623 fungal isolates were reported, 59.8% were Aspergillus species, 21.2% were Fusarium species, significantly reiterating the difference between northern and southern India. In a study by Xie et al [7], fungal isolates were of Fusarium species in 437 (73.3%) eyes and Aspergillus species in 72 (12.1%) eyes. In the Mycotic Ulcer Treatment Trial by Prajna et al [4], the most common fungi isolated was Fusarium species in 128 patients (40%), followed by Aspergillus species in 54 patients (17%).

In our study, there was a statistically significant improvement in the best corrected visual acuity at 3 months.

In our study, 154 (38.12%) ulcers healed with natamycin only, 100 (64.94%) of them were due to Fusarium species.

Among the 180 patients who were started on two drugs at presentation, 175 (97.22%) patients healed. Among these 175 cases, 63 (36%) cases healed with a combination of natamycin and voriconazole, 112 (64%) cases healed with a combination of natamycin and itraconazole.

Among the 63 cases that healed with a combination of natamycin and voriconazole, 33 (52.38%) cases were due to Fusarium species and 30 (47.62%) cases were due to Aspergillus species. Among the 112 cases that healed with a combination of natamycin and itraconazole, 70 (62.50%) cases were due to Fusarium species and 42 (37.50%) cases were due to Aspergillus species.

Among the 70 patients who were started on more than two drugs at presentation, 26 (37.14%) cases healed whereas 44 (62.86%) cases did not. Among the 26 cases that healed with more than two drugs, 15 (57.69%) cases were due to Fusarium species and 11 (42.31%) cases were due to Aspergillus species.

Among the 404 patients in our study, therapeutic penetrating keratoplasty was done in 49 (12.13%) patients. Indications were corneal perforation in 37 (75.51%) cases. In a study by chowdhary et al [10], 36 patients (18.8%) required therapeutic penetrating keratoplasty. Indications for keratoplasty were corneal perforation in 26 eyes and worsening of the ulcer in 10 eyes.

CONCLUSION:

Fusarium species remains to be the most commonly isolated fungal pathogen in southern India. However the incidence of Aspergillus species seems to be increasing. Fusarium species heals well with natamycin but Aspergillus species would fare better if voriconazole or itraconazole were used additionally. Aspergillus species are more virulent and have increased rates of corneal perforation. Standard therapy with polyenes still remains effective. Early diagnosis and effective treatment of fungal keratitis is the mainstay to prevent the visual threatening complications.

ANNEXURE

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ABBREVIATIONS

Logarithm of the minimum angle of resolution (logMAR)

Best corrected visual acuity (BCVA)

Standard deviation (SD)

Potassium Hydroxide (KOH)

Polymerase Chain Reaction (PCR)

Therapeutic penetrating keratoplasty (TPK)

EVALUATION FORM/ PROFORMA

COMPARISON OF THE TREATMENT OUTCOMES FOLLOWING FUSARIUM AND ASPERGILLUS KERATITIS

Study sample number: ☐ Date: ☐☐☐☐☐☐

Patient Details:

1.	NAME	
2.	M. R. NUMBER	☐☐☐ ☐☐☐☐
3.	GENDER	☐ 1. Male 2. Female
4.	AGE	☐
5.	ADDRESS	
6.	CONTACT NUMBER	

Age:

1. 20-30 ☐ 2. 31-40 ☐ 3. 41-50 ☐ 4. 51-60 ☐ 5. 61-70 ☐

Occupation: ☐

1. Agricultural worker/farmer
2. Labourer (heavy manual labour, lifting, loading)
3. Tradesman/professional (mechanics, stone masons, electricians and welders. Also includes professions such as police, office workers, factory workers and drivers)
4. Unemployed

5. Others: _____

OCULAR HISTORY:

Affected eye: ☐ 1. Right eye 2. Left eye

Symptoms: 1. Yes 2. No ☐

Redness ☐ Pain ☐ Watering ☐ Photophobia Blurring of vision ☐
Others ☐

Recent trauma: ☐ 1. Yes 2. No

If yes, ☐

1. Vegetable matter 2. Thorn or tree branch 3. Animal matter (Cow's tail, cow dung, insect) 4. Dust 5. Fingernail 6. Others: _____

Contact lens wear: ☐ 1. Yes 2. No

SYSTEMIC HISTORY: ☐

1. Diabetes Mellitus 2. Hypertension

3. Both DM and HTN 4. None

Whether on treatment: ☐ 1. Yes 2. No

Duration: _____

RECENT MEDICATIONS:

Topical antifungals: 1. Yes 2. No

YES/ NO	NAME	DOSAGE	FREQUENCY	DURATION
	Natamycin			
	Voriconazole			
	Econazole			
	Amphotericin B			
	Fluconazole			
	Others			

Other topical medications: ☐ 1. Yes 2. No

Name of the medication: _____

Frequency: _____ Duration: _____

Systemic antifungals: ☐ 1. Yes 2. No

Name of the medication: _____

Frequency: _____ Duration: _____

Topical native medications: ☐ 1. Yes 2. No

If yes, ☐

1. Mother's milk 2. Oil 3. Chicken blood 4. Tongue 5. Nil

H/o ocular surgery: ☐ 1. Yes 2. No

If yes, _____

CLINICAL EXAMINATION:

Date: ☐☐☐☐☐☐

TIME- POINT: ☐

1. At enrollment 2. Every 3 days until re- epithelialization

3. Every week till 3 weeks 4. At 1 month

5. At 3 months 6. Additional visits

VISUAL ACUITY:

	At presentation	At 3 weeks	At 3 months
Uncorrected visual acuity (UCVA)			
Best corrected visual acuity (BCVA)			

OCULAR EXAMINATION:

I. Eyebrows/ lids/ adnexa: 1. Yes 2. No

Madarosis	☐	Blepharitis	☐
Trichiasis	☐	Meibomitis	☐
Ectropion	☐	Entropion	☐
Lagophthalmos	☐	Dacryocystitis	☐

Others: _____

II. Conjunctiva: 1. Yes 2. No

Circum corneal congestion ☐

Chemosis ☐

Others: _____

III. Anterior chamber: 1. Yes 2. No

Cells ☐ If yes, ☐

a. 0 b. 0.5+ c. 1+ d. 2+ e. 3+ f. 4+

Flare ☐ If yes, ☐

a. 0 b. 1+ c. 2+ d. 3+ e. 4+

Others: _____

IV. Iris: ☐

1. Normal 2. Abnormal

V. Pupil: 1. Yes 2. No

Reaction to light ☐

VI. Lens: 1. Yes 2. No

Visualised ☐

If yes, ☐ 1. Cataract present 2. Cataract absent

Posterior segment evaluation: ☐

1. Normal 2. Abnormal 3. Not examined

IOP (Digital Tonometry) : ☐

1. Normal 2. Increased 3. Decreased

Duct of the affected eye: ☐

1. Free 2. Not free with clear fluid

3. Not free with pus 4. None

RBS: _____ mg%

EXAMINATION OF CORNEA:

DRAWING:

Site of the ulcer: ☐

1. Entirely in the periphery
2. Overlapping the central 4-mm circle and periphery without filling the centre
3. Entirely in the central 4-mm circle
4. Completely filling the 4-mm circle and extending to the periphery.

	Longest diameter in mm	Longest perpendicular width in mm
Size of epithelial defect		
Size of stromal infiltrate/ scar		

Time to re- epithelialization: (To be filled in during follow- up visits only)

_____

Infiltrate/ scar depth: ☐

1. No infiltrate/ scar 2. 0-33% depth

3. >33-67% depth 4. >67-100% depth

Hypopyon: ☐ 1.Yes 2. No

If yes, height: _____ mm

Other clinical findings: 1. Yes 2. No

Raised lesion ☐ Satellite lesions ☐ Feathery margins ☐

Endothelial plaque ☐ Immune ring ☐

Absence of corneal sensation ☐

Clinical impression: ☐

1. Healed 2. Healing 3. Remained same 4. Worsened

MICROBIOLOGICAL REPORT:

Date: ☐☐☐☐☐☐

TIME- POINT: ☐ 1. At enrollment 2. Repeat culture

CORNEAL SMEAR:

10% KOH: ☐ 1. Fungus present 2. Fungus absent

GRAM'S: ☐ 1. Bacteria present 2. Bacteria absent

☐ 3. Fungus present 4. Fungus absent

CULTURE:

MEDIA	RESULT
Sheep's blood agar	
Potato dextrose agar	

Lactophenol cotton blue staining report:

DIAGNOSIS: ☐ 1. Fusarium 2. Aspergillus

TREATMENT GIVEN: | | | | |

1. Topical 5% Natamycin
2. Topical 1% Voriconazole
3. Topical 2% Econazole
4. Topical 0.15% Amphotericin B
5. Topical 1 % Itraconazole
6. Systemic antifungals
7. Intrastromal antifungal injection

DRUG	DATE STARTED	DOSAGE	FREQUENCY	DURATION
Topical 5% Natamycin				
Topical 1% Voriconazole				
Topical 2% Econazole				
Topical 0.15% Amphotericin B				
Topical 1 % Itraconazole				
Systemic antifungals				
Intrastromal antifungal injection				

PERFORATION: ☐

1. Yes 2. No Date: ☐☐☐☐☐☐

Duration between presentation to the hospital and date of perforation: ☐☐

THERAPEUTIC PENETRATING KERATOPLASTY: ☐

1. Yes 2. No

Operated on: ☐☐☐☐☐☐

Indication: ☐

1. Perforation 2. Impending perforation

3. Worsening of ulcer

Outcome: ☐

1. Clear graft 2. Failed graft 3. Graft infiltrate

CONSENT FORM

Informed Consent form to participate in a clinical study.

Study Title: **COMPARISON OF THE TREATMENT OUTCOMES FOLLOWING FUSARIUM AND ASPERGILLUS KERATITIS.**

Protocol Number:

Subject's Name: _____

Subject's Initials: _____

Subject ID No: _____

		Please put initial in the box (Subject)
(i)	I confirm that I have understood the information about the study, procedures and treatments for the above study and have had the opportunity to ask questions and I received satisfactory answers to all of my questions. I have been given a copy of the informed consent form to take home	[ ]
(ii)	I understand that my participation in the study is voluntary and that I am free to withdraw at any time, without giving any reason, without my medical care or legal rights being affected. However, this is may not be possible for certain surgical procedures	[ ]
(iii)	I understand that the Investigator of the study to access my health records for the research purpose. However, I understand that my identity will not be revealed in any information released to third parties or published.	[ ]

(iv)	I agree not to restrict the use of any data or results that arise from this study provided such a use is only for scientific purpose(s)	[ ]
(v)	I agree to take part in the above study.	[ ]

Signature (or Thumb impression) of the Subject:

Subject's Name:

Date:

Signature (or Thumb impression) of

Legally Acceptable Representative (LAR):

Date:

Signature of the Investigator:

Investigator's Name:

Date:

Signature of the Witness:

Name of the Witness:

Date:

ARAVIND MEDICAL RESEARCH FOUNDATION
Institutional Ethics Committee
(REGISTRATION NO. ECR/182/INST/TN/2013 DATED 20.04.2013)

12th December 2015

To
Dr. M. Sivadarshan
MS Resident
Aravind Eye Hospital
Madurai

Dear Dr.Sivadarshan,

Thesis Title: Comparison of the treatment outcomes following *Fusarium* and *Aspergillus* keratitis

IRB Code: IRB201500223

Thank you for submitting your thesis and seeking the approval from the ethics committee. The documents provided by you for consideration which include the thesis protocol and informed consent forms were reviewed for the research methodology and scientific content. The Ethical committee did not find any correction and has recommended the thesis to go ahead in the present form.

Thanking you

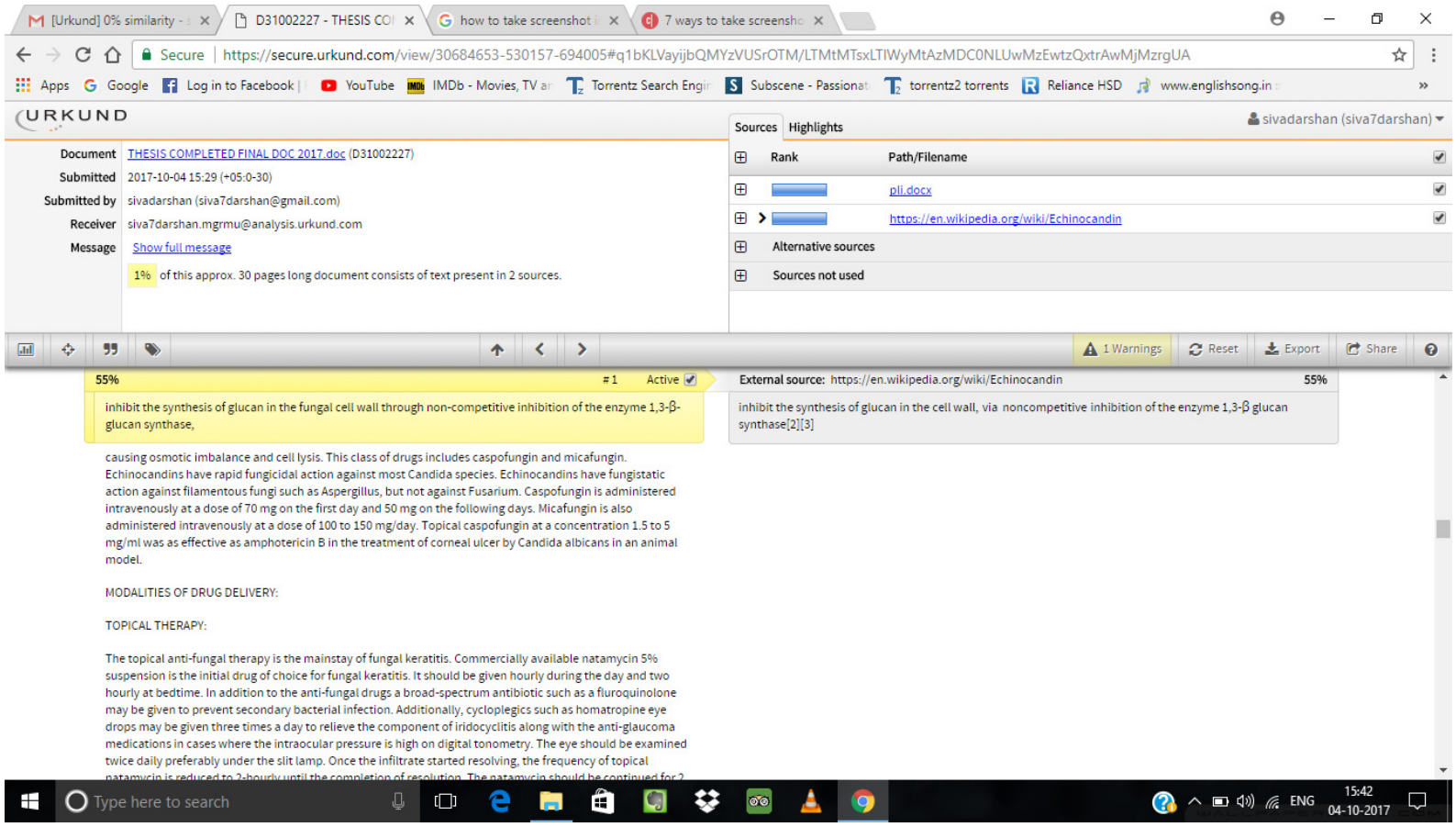
Yours Sincerely,

S. Lalitha

Dr.Lalitha Prajna
Member Secretary
Institutional Ethics Committee

MEMBER SECRETARY
INSTITUTIONAL ETHICS COMMITTEE
ARAVIND MEDICAL RESEARCH FOUNDATION
No.1, Anna Nagar, Madurai-625 020

1, Anna Nagar, Madurai 625 020, Tamil Nadu, India; Phone: 0452-435 6550; Fax: 91-452-253 0984
E-mail: amrf@aravind.org; www.aravind.org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inhibit the synthesis of glucan in the fungal cell wall through non-competitive inhibition of the enzyme 1,3-β-glucan synthase,
External source: https://en.wikipedia.org/wiki/Echinocandin
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inhibit the synthesis of glucan in the cell wall, via noncompetitive inhibition of the enzyme 1,3-β glucan synthase[2][3]
causing osmotic imbalance and cell lysis. This class of drugs includes caspofungin and micafungin. Echinocandins have rapid fungicidal action against most Candida species. Echinocandins have fungistatic action against filamentous fungi such as Aspergillus, but not against Fusarium. Caspofungin is administered intravenously at a dose of 70 mg on the first day and 50 mg on the following days. Micafungin is also administered intravenously at a dose of 100 to 150 mg/day. Topical caspofungin at a concentration 1.5 to 5 mg/ml was as effective as amphotericin B in the treatment of corneal ulcer by Candida albicans in an animal model.
MODALITIES OF DRUG DELIVERY:
TOPICAL THERAPY:
The topical anti-fungal therapy is the mainstay of fungal keratitis. Commercially available natamycin 5% suspension is the initial drug of choice for fungal keratitis. It should be given hourly during the day and two hourly at bedtime. In addition to the anti-fungal drugs a broad-spectrum antibiotic such as a fluroquinolone may be given to prevent secondary bacterial infection. Additionally, cycloplegics such as homatropine eye drops may be given three times a day to relieve the component of iridocyclitis along with the anti-glaucoma medications in cases where the intraocular pressure is high on digital tonometry. The eye should be examined twice daily preferably under the slit lamp. Once the infiltrate started resolving, the frequency of topical
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URKUND

Urkund Analysis Result

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Significance: 1 %

Sources included in the report:

pli.docx (D30910374)
https://en.wikipedia.org/wiki/Echinocandin

Instances where selected sources appear:

2

STUDY NO	NAME	GENDER	AGE	AGE GROUP	OCCUPATION	EYE	TRAUMA	MODE OF TRAUMA	CL WEAR	SYSTEMIC	RECENT TOPICAL	RECENT NATIVE MEDS	OCULAR SX	V/A	DUCT	RBS	SITE	SIZE	INFILTRATE DEPTH	HYPOPYON	SMEAR	CULTURE	RX
1	CHANDRA DEVI	2	55	4	1	2	1	1	2	1	1	5	2	4 60	1	82	4	6*3	3	2	1	1	1,2
2	PIDARI	2	45	3	1	2	2		2	4	2	5	2	6 60	1	117	2	3*3	2	2	1	2	1
3	PANJAVARNAM	2	54	4	1	1	1	2	2	1	1	1	2	HM	1	97	4	7*7	3	1	1	1	1,2,5
4	CHANDRAN A	1	45	3	1	1	1	1	2	4	1	5	2	6 36	1	84	2	2*2	2	2	1	1	1
5	CHINNA	1	48	3	1	1	2		2	1	1	5	2	5 60	1	90	3	4*4	2	2	1	2	1,5
6	BALASUBRAMANI S	1	44	3	2	2	1	2	2	2	1	5	2	1/2 60	1	151	4	6*7	3	1	1	2	1,2,5
7	NAGAMMA	2	52	4	1	1	1	1	2	4	1	5	1	5 60	1	86	3	4*4	2	2	1	1	1,5
8	ANWAR BATCHA	1	56	4	3	1	1	1	2	1	1	5	2	6 24	1	106	2	2*2	2	2	1	1	1
9	VALLIAMMAI G	2	20	1	1	1	2		2	4	1	5	2	6 18	1	97	1	1*2	2	2	1	1	1
10	KALIAMMAL S	2	48	3	1	1	2		2	2	2	5	1	4 60	1	81	4	5*3	3	1	1	1	1,5
11	PRITHVIRAJ C	1	22	1	4	2	1	1	2	4	1	5	2	5 60	1	80	3	3*3	2	2	1	1	1
12	MUNIYASAMY	1	65	5	1	1	1	3	2	1	1	4	2	1 60	1	85	4	7*7	3	1	1	2	1,2
13	VEERANAN A	1	50	3	2	1	1	2	2	4	2	5	2	4 60	1	140	4	3*3.5	2	2	1	1	1,5
14	SUBBAIAH P	1	56	4	2	2	1	1	2	2	2	5	2	5 60	1	110	3	2*2	3	2	2	2	1
15	SEENI S	1	25	1	4	1	2		2	4	1	5	2	6 24	1	120	2	2*3	2	2	1	2	1,5
16	MURUGAN M	1	43	3	1	2	1	1	2	3	2	5	2	6 60	1	140	2	3*2	2	2	1	1	1,5
17	RACKKI A	2	47	3	2	2	1	2	2	2	1	5	1	FCF	1	110	4	5*7	3	1	1	2	1,5
18	JILANI	2	55	4	1	1	1	1	2	4	1	5	2	PL PR	1	139	4	6*6	3	1	1	2	1,2
19	RAJU S	1	52	4	3	1	1	2	2	3	1	5	2	1 60	1	294	4	5*6	3	1	1	2	1,2
20	CHINNAIAH D	1	49	3	3	1	1	1	2	1	1	5	2	6 60	1	137	3	3*3	2	2	2	1	1,5
21	ALAGARSAMY	1	52	4	2	1	2		2	4	1	5	2	5 60	1	145	4	5*3	3	2	1	1	1,2,5
22	MALLIKA C	2	45	3	1	1	1	2	2	4	1	1	2	5 60	1	172	3	2*2	2	2	1	2	1
23	UMADEVI	2	45	3	1	2	2		2	4	1	5	2	6 12	1	126	1	2*1	2	2	1	1	1
24	POOPANDI	1	58	4	1	2	2		2	4	1	5	2	6 36	1	134	2	2*2	2	2	1	1	1
25	SUKHIBAI	2	45	3	1	1	1	5	2	2	1	5	2	6 60	1	142	3	3*4	3	2	1	2	1,5
26	CHINNAPONNU	2	49	3	1	2	1	1	2	4	1	5	1	3 60	1	102	4	3*6	2	2	1	2	1,5
27	CHINNAKARUPPAN	1	27	1	1	1	2		2	3	1	5	2	6 24	1	140	2	2*2	2	2	1	1	1
28	SAIKUMAR K	1	55	4	2	2	2		2	4	1	5	2	2 60	1	127	4	5*7	3	1	1	2	1,5
29	MUTHUSAMY P	1	50	3	2	1	1	2	2	1	1	5	1	HM	1	110	4	7*6	4	1	1	1	1,2,5
30	HARINATH M	1	62	5	1	2	2		2	4	1	5	2	3 60	1	113	4	5*6	2	2	1	1	1,5
31	VIGNESH M	1	30	1	3	2	1	5	2	4	1	5	2	6 60	1	140	3	4*4	2	2	1	1	1
32	KARUPPATHAL N	2	42	3	1	2	1	1	2	1	1	5	2	PL	1	150	4	6*6	3	1	1	1	1,5
33	MUNIYAPPAN R	1	55	4	2	2	1	3	2	4	1	5	2	6 18	1	130	2	3*2	2	2	1	1	1
34	MADASAMY M	1	47	3	2	1	1	1	2	3	1	5	2	FCF	1	102	4	5*7	2	1	2	2	1,2
35	CHINNAIAH P L	1	65	5	1	1	2		2	4	1	5	2	5 60	1	110	3	2*2	2	2	1	1	1
36	RAJIYA BEGUM A	2	55	4	1	1	2		2	1	1	5	2	6 18	1	119	2	2*1	2	2	1	2	1
37	THIRUMALAI V	1	47	3	1	1	2		2	1	1	5	2	6 60	1	83	3	3*2	2	2	1	1	1,5
38	MUTHURAJ A	1	60	4	1	1	1	2	2	1	1	5	2	PL	1	100	4	6*8	4	2	1	2	1,2,5
39	RUCKMANI P	2	45	3	1	2	1	1	2	3	1	5	2	5 60	1	82	2	3*3.5	2	2	1	2	1
40	KANNAN A	1	60	4	4	2	2		2	4	1	5	1	6 24	1	117	2	2*2	2	2	1	1	1
41	MANI M	1	65	5	2	2	1	3	2	1	1	1	2	6 18	1	145	1	2*2	2	2	1	1	1
42	VENKATA SUBBAREDDY	1	62	5	1	2	1	1	2	4	1	5	2	5 60	1	137	2	3*2	2	2	1	2	1
43	PONNAN T	1	55	4	1	1	2		2	2	1	5	1	6 36	1	112	2	4*4	2	2	1	1	1,5
44	SHANTHI S	2	45	3	1	1	2		2	3	1	5	2	5 60	1	95	2	3*3.5	2	2	1	1	1,5
45	SHANTHI S	2	58	4	1	2	1	2	2	1	1	5	2	6 60	1	140	2	3*3	2	2	1	2	1
46	MAYILATHAL	2	65	5	1	1	2		2	4	1	5	2	4 60	1	107	4	4*5	2	2	1	2	1,5
47	NAGARAJU	1	55	4	1	2	1	5	2	4	1	5	2	6 36	1	145	2	4*4	2	2	1	1	1
48	MARIAMMAL K	2	53	4	1	2	1	1	2	4	1	5	2	6 36	1	102	2	2*2	2	2	2	2	1
49	ESWARAIAH N	1	54	4	4	2	1	1	2	4	1	5	2	5 60	1	100	3	3*3	2	2	1	1	1
50	RAMANA G	1	55	4	1	1	2		2	4	1	5	2	6 36	1	117	3	3*3	3	2	1	2	1
51	MARIAMMAL R	2	46	3	1	1	1	3	2	1	1	5	2	6 60	1	89	2	2*2	2	2	1	2	1,5
52	MUTHU K	1	50	3	2	1	1	3	2	4	1	5	2	5 60	1	124	3	4*4	2	2	1	1	1,5
53	SUBRAMANIAN S	1	35	2	1	1	1	1	2	4	1	5	2	5 60	1	241	2	4*3	2	2	1	1	1,5
54	SUBRAMANI V	1	58	4	1	2	2		2	4	1	5	1	6 24	1	104	2	4*4	2	2	1	2	1,5
55	SURESH KUMAR M	1	45	3	2	2	1	2	2	4	1	5	2	6 36	1	78	2	3*3	2	2	1	1	1
56	RAMU U	1	41	3	2	2	2		2	4	2	5	2	6 18	1	72	2	1.5*1.5	2	2	1	1	1
57	SINGARAVEL P	1	56	4	1	1	1	5	2	1	1	5	1	6 60	1	88	3	5*3	3	2	1	1	1,5

58	SIVAPPURAJA T	1	42	3	1	2	2		2	4	1	5	2	6 18	1	83	1	3*3	2	2	1	2	1,2
59	CHINNAMMAL E	2	65	5	1	2	1	3	2	4	1	1	2	FCF	1	100	4	5*6	3	1	1	2	1,2,5
60	VENKATALAKSHMI	2	53	4	1	1	2		2	4	1	5	2	6 60	1	82	2	3*3.5	2	2	1	1	1
61	PENCHALAIAH	1	55	4	2	1	1	3	2	4	1	5	2	1/2 60	1	117	4	7*5	3	1	1	1	1,2,5
62	AMARAVATHI K	2	50	3	2	1	2		2	4	2	5	2	6 60	1	97	5	4*4	2	2	2	2	1,2
63	JEYANTHI P	2	68	5	2	1	2		2	4	1	5	2	3 60	1	84	4	5*5	2	2	2	1	1,5
64	SANKAR V	1	60	4	1	2	2		2	3	2	5	2	6 18	1	90	2	4*4	2	2	1	1	1,5
65	MOHAN V	1	25	1	4	1	1	1	2	4	1	5	2	6 60	1	151	3	3*3.5	2	2	1	2	1,5
66	MURUGAN K	1	60	4	1	2	2		2	1	1	5	2	5 60	1	86	3	5*3	3	2	1	2	1,2,5
67	MONICKA	2	28	1	3	2	2		2	4	2	5	2	6 18	1	106	1	2*1	2	2	1	1	1
68	MUTHULAKSHMI S	2	63	5	1	1	1	4	2	4	1	5	1	6 60	1	97	2	2*2	2	2	1	1	1,2
69	GANESAN N	1	56	4	1	1	2		2	4	1	5	2	6 12	1	81	1	2*2	3	2	1	2	1,5
70	PAPPATHI A	2	45	3	1	2	1	2	2	4	1	5	2	5 60	1	80	3	3*3	3	2	1	1	1,5
71	UNNAMALAI	1	55	4	1	1	1	3	2	4	1	2	1	6 24	1	100	2	3*3	2	2	1	2	1,5
72	MUNIYAMMAL M	2	42	3	1	2	1	1	2	1	1	5	2	5 60	1	117	3	2*4	2	2	1	1	1,2,5
73	TAMILSELVI U	2	60	4	1	1	2		2	2	1	5	2	6 12	1	89	2	2*2	2	2	1	1	1
74	ARUNA M	2	65	5	1	2	2		2	4	1	5	2	6 24	1	124	1	2*2	2	2	1	2	1,5
75	VADIVEL K	1	65	5	1	1	2		2	4	1	5	2	5 60	1	249	3	4*3	2	2	1	1	1,5
76	PANDIYAN M	1	58	4	1	1	1	3	2	4	1	2	2	6 60	1	150	3	4*4	3	2	2	1	1,5
77	NATCHAMMAI C	2	49	3	1	1	1	4	2	4	1	5	2	6 24	1	102	3	3*3	2	2	1	1	1
78	IYAPPAN S	1	52	4	3	2	2		2	4	1	5	2	6 24	1	100	2	1.5*1.5	2	2	1	2	1
79	ANTHONI SAMY Y	1	70	5	1	1	1	1	2	4	2	5	2	4 60	1	117	4	5*3	3	2	1	2	1,5
80	SAHAYA RAJ L	1	54	4	2	2	2		2	2	1	5	2	6 60	1	89	2	3*3	2	2	1	1	1,5
81	MUKILA M	2	55	4	2	2	1	2	2	4	1	5	2	5 60	1	124	2	2*2	2	2	1	1	1
82	CHELLADURAI M	1	60	4	2	2	2		2	4	1	5	1	6 18	1	96	2	3*3.5	2	2	1	2	1,2
83	CHANDRA SEKHAR G	1	58	4	1	1	1	3	2	2	1	5	2	6 9	1	126	1	2*2	2	2	1	1	1
84	RUCKMANI P	2	45	3	1	1	2		2	4	1	5	2	6 36	1	217	2	2*3	2	2	1	1	1,2,5
85	PALANIVEL K	1	50	3	1	1	1	3	2	4	1	3	1	5 60	1	267	2	3*3	2	2	1	2	1,5
86	MUNEESWARAN N	1	60	4	1	2	2		2	4	1	5	2	6 18	1	200	2	2*2	2	2	1	2	1,2,5
87	SEETHALAKSHMI M	2	42	3	1	1	2		2	3	1	5	2	6 60	1	147	3	2*2	2	2	1	1	1
88	GOVINDAN V	1	45	3	1	2	2		2	1	1	5	2	5 60	1	120	3	4*4	2	2	1	1	1,5
89	BOOMI V	1	55	4	1	2	1	3	2	4	1	5	2	2 60	1	110	4	4*5	3	2	1	2	1,2,5
90	GOMATHY C	2	32	5	1	1	1	3	2	4	1	5	2	1/2 60	1	108	4	4*4	3	1	2	2	1,2,5
91	KARUPPAYEE N	2	50	3	1	2	1	2	2	2	1	5	2	6 60	1	98	4	3*3	2	2	1	1	1,5
92	AMMALU	2	64	5	2	1	2		2	4	1	5	2	6 60	1	102	2	1.5*1.5	2	2	2	2	1
93	ARUL PRAKASH S	1	51	4	2	2	2		2	4	2	5	2	6 18	1	100	1	2*2	2	2	1	1	1,5
94	MANI A	1	41	3	2	2	1	5	2	4	1	5	2	6 24	1	117	2	2*1	2	2	1	2	1
95	VENKATESH V	1	55	4	1	1	2		2	2	1	5	2	5 60	1	89	3	2*2	2	2	1	1	1
96	KALIDASS M	1	43	3	1	1	1	1	2	4	1	4	1	5 60	1	124	2	3*3.5	3	2	1	1	1,5
97	ARUMUGAM P	1	67	5	4	1	1	3	2	4	1	5	2	6 60	1	249	2	2*2	2	2	1	1	1,5
98	KRISHNAN	1	24	1	3	1	2		2	1	2	5	2	6 36	1	100	2	2*4	2	2	1	2	1,2
99	PITCHAI DEVAR	1	48	3	1	1	1	4	2	1	1	5	1	5 60	1	83	3	3*2	2	2	1	2	1
100	KUMAR S	1	28	1	3	2	1	1	2	4	1	5	2	6 24	1	116	2	2*3	2	2	1	2	1,5
101	ARUL DASS D	1	46	3	1	2	1		2	4	2	5	2	6 18	1	128	2	2*1	2	2	1	1	1
102	PANDI P	1	53	4	1	1	2		2	4	1	5	2	5 60	1	110	2	3*3	2	2	1	2	1,2
103	MURUGESAN K	1	30	1	3	2	1	3	2	4	1	5	2	6 24	1	79	2	2*2.5	2	2	1	1	1
104	MOHAMMED ASMI S	1	35	2	2	1	2		2	4	2	5	2	6 24	1	80	1	1.5*1	2	2	2	1	1
105	SEKAR M	1	55	4	2	1	2		2	4	2	5	2	6 60	1	80	3	3*3	2	2	2	1	1,5
106	KASIM G	1	48	3	1	1	2		2	4	1	5	2	6 36	1	79	3	2*2	2	2	1	2	1
107	ANNAKILI V	2	57	4	1	2	1	2	2	4	1	1	2	5 60	1	98	3	3*3.5	2	2	1	2	1
108	SANKARAN V	1	36	2	2	1	2		2	1	1	5	2	6 36	1	112	1	2*2	2	2	1	1	1
109	RUTHIRA MOORTHY S	1	57	4	1	2	2		2	4	2	5	2	5 60	1	89	3	4*4	3	2	1	1	1,5
110	KARUKKAVEL I	1	55	4	1	1	1	4	2	1	1	5	1	6 60	1	110	3	2*2	2	2	1	1	1
111	MANIKANDAN K	1	35	2	3	1	2		2	4	1	5	2	6 60	1	78	3	1.5*1.5	2	2	1	1	1
112	GOVINDAMMAL K	2	60	4	1	2	1	1	2	4	1	2	2	6 60	1	150	2	5*3	2	2	1	2	1,5
113	PALANISAMY	1	50	3	1	2	1	3	2	3	1	2	1	PL	1	93	4	6*7	3	1	1	1	1,2,5
114	NAGARAJAN R	1	45	3	3	1	2		2	1	1	5	2	6 18	1	120	2	2*2	2	2	1	1	1,5
115	SEENAIAH V	1	58	4	1	1	2		2	1	1	5	2	6 18	1	142	2	2*2	2	2	1	1	1
116	DEVDASS S	1	43	3	1	2	1	3	2	4	2	5	2	5 60	1	99	3	1.5*1.5	2	2	1	2	1
117	MARY LAISHA	2	47	3	1	2	1	4	2	4	1	5	2	6 18	1	108	2	5*3	3	2	2	1	1,5
118	CHITRA N	2	55	4	1	2	2		2	4	1	5	2	6 60	1	200	4	3*3	2	2	2	1	1,2
119	PITCHAI KALAI P	1	60	4	2	1	2		2	4	1	5	2	6 24	1	135	2	4*4	2	2	1	2	1,5

120	RAJANGAM	1	57	4	1	2	1	1	2	4	1	5	2	HM	1	153	4	5*5	3	1	1	2	1,2
121	ANUSIYA DEVI M	2	40	2	1	1	2		2	2	1	5	2	6 24	1	79	2	2*2	2	2	1	2	1
122	RAVICHANDRAN P	1	55	4	2	1	1	3	2	4	2	5	2	6 24	1	156	1	1.5*1.5	2	2	1	1	1
123	MUTHUKUMAR R	1	50	3	3	2	1	3	2	1	1	5	2	5 60	1	245	4	5*3	2	1	1	2	1,5
124	ARRANGANATHAN R	1	52	4	2	1	2		2	4	1	5	1	6 60	1	157	4	2*2	2	2	1	1	1
125	SIVAIAH T	1	50	3	1	2	1	2	2	3	1	5	2	5 60	1	246	2	3.5*3.5	2	2	1	2	1,5
126	CHINNA DURAI S	1	40	2	3	1	2		2	4	2	5	2	6 60	1	142	3	4*2	2	2	2	1	1,2
127	SAKILA DEVI A	2	35	2	2	1	1	5	2	4	2	5	1	6 60	1	154	3	4*2	2	2	1	1	1,2
128	PONNAMMAL K	2	45	3	1	1	2		2	4	1	5	2	6 36	1	106	4	2*3	2	2	1	2	1,2
129	ALAGARSAMY S	1	52	4	3	2	1	1	2	4	1	3	2	HM	1	100	4	6*3	3	1	1	2	1,2,5
130	PONNANDI V	1	48	3	1	1	1	3	2	3	1	2	2	4 60	1	162	3	5*5	3	1	1	1	1,2,5
131	VINOTH KUMAR I	1	55	4	2	1	1	3	2	4	1	5	2	6 60	1	124	3	2*2	2	2	1	1	1
132	JEYA MANI P	2	40	2	1	1	2		2	4	1	5	2	6 60	1	420	2	3*3	2	2	2	2	1,2,5
133	MARIAMMAL P	2	37	2	1	2	1	1	2	4	2	5	2	5 60	1	17	3	3*3	2	2	1	1	1
134	VIVEKANANTHA S	1	60	4	2	2	2		2	3	1	5	2	5 60	1	145	2	3*2	3	2	1	1	1
135	GUNASEELAN M	1	50	3	2	1	2		2	4	1	5	2	6 60	1	137	3	4*4	2	2	1	2	1,2
136	RAMANAMMA C	2	60	4	1	2	1	2	2	1	1	5	2	6 18	1	112	2	2*2	2	2	1	1	1,2
137	PANDIAMMAL K	2	65	5	1	1	1	1	2	4	1	5	2	PL	1	113	4	6*6	3	2	2	1	1,2,5
138	BALAMANI M	2	58	4	1	2	1	3	2	4	1	5	1	PL	1	140	4	6*7	3	1	1	1	1,2,5
139	HAJEE AKBAR M	1	38	2	2	2	1	4	2	4	1	5	2	6 24	1	107	2	2*2	2	2	1	1	1,2
140	PALANISAMY C	1	60	4	4	1	2		2	4	2	5	2	5 60	1	145	2	2*4	2	2	1	2	1,5
141	RAJENDRAN M S	1	55	4	3	1	2		2	4	1	5	1	3 60	1	102	4	3*3	2	1	1	2	1,5
142	BALAMURUGAN S	1	45	3	1	2	1	1	2	4	1	4	2	6 60	1	100	2	3*2	2	2	1	1	1
143	SEVAGAN A	1	42	3	1	1	2		2	3	1	5	2	6 24	1	117	2	3*3	2	2	1	1	1
144	VELAISAMY L	1	55	4	1	1	2		2	1	1	5	2	6 36	1	89	2	3*2	2	2	1	1	1,5
145	PANCHABATLA VENU	1	45	3	2	2	1	3	2	4	1	5	2	6 9	1	124	1	1*2	2	2	1	2	1,2
146	KALYANA SUNDARAM S	1	42	3	3	2	1	2	2	4	1	5	2	6 60	1	241	3	2*3	2	2	2	1	1,5
147	NITHIKUMAR M	1	52	4	2	2	1	4	2	4	1	5	2	6 36	1	104	2	2*2	2	2	2	2	1,5
148	MURUGAN P	1	55	4	3	2	1	2	2	4	1	5	2	5 60	1	120	2	3*3	2	2	1	2	1
149	MUNIYANDI K	1	43	3	1	2	2		2	3	1	5	2	6 12	1	102	2	1*1	2	2	1	1	1
150	CHELLATHAI	2	67	5	1	1	1	5	2	4	2	5	2	HM	1	100	3	6*5	3	2	2	1	1,2,5
151	ALPHONSE MARY S	2	55	4	1	1	1	2	2	2	1	5	2	1 60	1	117	4	6*6	3	1	1	2	1,2,5
152	PALRAJ K	1	37	2	1	2	2		2	4	1	5	1	6 18	1	89	2	2*2	2	2	1	2	1
153	KATHIRI VEL G	1	54	4	1	2	2		2	4	1	5	2	6 24	1	124	2	2*3	2	2	1	1	1
154	CHELLATHAI	2	44	3	1	1	1	4	2	4	1	5	2	6 18	1	249	1	1*2	2	2	1	2	1
155	VALARMATHI R	2	50	3	1	2	1	4	2	1	1	1	1	PL	1	100	4	6*5	3	1	2	2	1,2,5
156	VELAYEE K	2	60	4	4	2	2		2	4	2	5	2	6 18	1	83	2	2*1	2	2	1	2	1,2,5
157	VARADHARAJAN K	1	45	3	2	2	1	3	2	4	1	5	2	6 60	1	116	4	3*3	2	2	2	2	1,2
158	MOHAMED AFRIDI K	1	54	4	3	1	2		2	4	1	5	2	6 24	1	110	1	3*3	2	2	1	2	1
159	ADHI NARAYANAN CH	1	44	3	3	2	1	1	2	3	1	5	2	HM	1	112	4	5*5	3	1	1	2	1,2,5
160	LAKSHMI A	2	55	4	4	2	2		2	4	1	5	2	6 60	1	85	3	4*2	2	2	2	1	1,2
161	VENKATA RAO Y	1	35	2	1	2	1	1	2	4	1	5	2	PL	1	220	4	4*5	4	1	1	1	1,2,5
162	PENCHALAIAH N	1	65	5	1	1	2		2	4	1	5	2	6 18	1	240	2	2*2	2	2	1	2	1,2
163	AJITH M	1	25	1	4	1	1	5	2	2	1	5	2	6 24	1	200	2	2*2	2	2	1	1	1
164	INDIRAN C	1	44	3	1	2	2		2	4	1	5	2	HM	1	356	4	6*5	3	2	1	2	1,2,5
165	NAZEER HUSSAIN S	1	37	2	3	2	1	2	2	4	1	5	2	6 24	1	118	2	2*2	2	2	1	1	1
166	CHINNATHAMBI	1	65	5	4	2	1	3	2	4	1	5	1	6 60	1	99	2	3*3	2	2	1	2	1
167	SAHAYAMARY A	2	57	4	1	1	2		2	1	1	5	2	FCF	1	120	4	6*4	3	2	1	2	1,2,5
168	JOHN S	1	55	4	3	1	2		2	4	1	5	2	6 18	1	118	1	2*1	2	2	2	1	1
169	KARUPPAIAH A	1	54	4	1	1	2		2	4	1	5	1	6 36	1	100	2	2*2	2	2	1	2	1,5
170	SWAMINATHAN	1	60	4	1	1	1	1	2	4	1	5	2	HM	1	99	3	6*5	3	1	1	1	1,2,5
171	AYYANAR K	1	45	3	1	2	2		2	2	1	5	2	6 24	1	90	3	2*2	2	2	1	2	1
172	ARUNACHALA THAI	2	50	3	1	2	2		2	4	1	5	2	6 60	1	92	2	3*3	2	2	1	1	1
173	GANESAN V	1	60	4	1	2	1	4	2	1	2	5	2	6 60	1	90	2	3*3	2	2	1	2	1
174	MUTHUPANDI A	1	48	3	1	2	1	1	2	2	1	4	2	HM	1	97	4	5*6	3	1	2	1	1,2,5
175	PERIYASAMY	1	47	3	1	2	1	5	2	4	1	5	2	6 18	1	124	2	2*1	2	2	1	2	1
176	MUTHURAMAN K	1	55	4	1	2	2		2	4	1	5	2	6 36	1	329	2	2*1	2	2	1	2	1
177	MARKKANDAN O	1	60	4	2	2	2		2	4	1	5	2	6 24	1	102	2	2*2	2	2	1	1	1
178	RAMANA REDDY	1	50	3	2	1	2		2	4	1	5	2	6 60	1	100	3	3*2	2	2	1	2	1,2
179	LALITHA	2	38	2	2	2	1	3	2	4	1	5	2	HM	1	117	4	4*4	2	1	1	1	1,2,5

180	KRISHNAMMAL A	2	51	4	1	2	1	2	2	4	2	5	2	6 60	1	89	2	2*3	2	2	2	2	1,2
181	CHINNAMMAL R	2	45	3	1	1	2		2	2	1	5	1	6 18	1	124	2	1*2	2	2	1	2	1
182	NAGAMMAL V	2	55	4	1	2	2		2	4	1	5	2	6 36	1	249	2	2*3	2	2	1	1	1,2
183	VELLAIAMMAL V	2	45	3	1	1	2		2	4	1	5	2	5 60	1	150	3	3*3	3	2	1	1	1,5
184	AKKINI S.	1	65	5	4	2	1	1	2	3	1	5	1	6 36	1	102	2	2*2	2	2	1	1	1
185	BOOMINATHAN M.	1	60	4	1	2	2		2	4	1	5	2	6 9	1	100	1	1*1	2	2	1	2	1
186	CHELLAMMAL P.	2	46	3	1	1	2		2	2	1	5	2	HM	1	117	4	5*6	3	1	1	1	1,2,5
187	MUTHUSAMY N.	1	55	4	1	1	1	5	2	2	1	5	2	5 60	1	89	3	3*3	2	2	1	2	1,5
188	CHELLA PERUMAL P.	1	45	3	2	2	2		2	4	1	5	2	2 60	1	124	4	5*2	3	2	2	2	1,2,5
189	NARAYANAN M.	1	60	4	1	2	1	4	2	4	2	5	2	6 60	1	249	3	3*3	2	2	2	1	1,5
190	PALANISAMY A.	1	61	5	1	1	2		2	4	1	5	2	5 60	1	87	2	3*3	2	2	1	1	1,2
191	PETCHIAMMAL	2	63	5	1	1	2		2	4	1	5	2	6 12	1	80	2	2*2	2	2	1	1	1
192	VIGNESH MUTHU KUMAR V. DR	1	51	4	3	1	1	2	2	4	1	1	2	5 60	1	100	3	2*2	2	2	1	1	1
193	ARUNACHALAM T.	1	45	3	1	1	2		2	4	1	5	2	6 60	1	130	3	3*2	2	2	1	2	1,2
194	SANGILI A.	1	55	4	1	1	1	3	2	4	1	5	2	6 60	FREE	94	2	2*2	2	2	1	1	1
195	BALAMURUGAN K.	1	40	2	1	1	1	5	2	3	1	5	2	4 60	1	88	3	4*4	3	2	1	2	1,5
196	FATHIMA MARY A.	2	55	4	1	1	2		2	2	1	5	1	6 36	1	87	2	3*2	2	2	1	1	1
197	VEERAMMAL R.	2	27	1	1	1	2		2	4	1	5	2	6 24	1	85	2	2*2	2	2	1	1	1,5
198	MANIKANDAN C.	1	22	1	2	1	2		2	4	2	5	2	6 24	1	178	3	2*1	2	2	2	2	1
199	MALYADRI K.	1	60	4	1	2	1	1	2	4	1	5	1	6 60	1	160	4	3*3	2	2	1	1	1
200	HUSSAIN BI	1	45	3	2	1	2		2	1	1	5	2	5 60	1	157	4	3*2	2	2	1	2	1
201	PRABHU C.	1	48	3	1	2	1	3	2	4	1	1	2	6 60	1	80	3	2*4	2	2	1	1	1,5
202	MADASAMY K.	1	55	4	1	1	2		2	4	1	5	2	6 36	1	134	2	2*2	2	2	2	2	1,5
203	MANIMEGALAI M.	2	50	3	1	1	2		2	3	1	5	2	6 24	1	123	2	3*2	2	2	1	2	1
204	SUKUMAR P.	1	45	3	3	2	2		2	4	1	5	2	6 36	1	300	3	4*4	2	2	1	1	1,5
205	MUTHURAMAN C.	1	60	4	2	1	1	2	2	4	1	5	2	1 60	1	120	4	5*5	3	1	1	2	1,2,5
206	KOTA MALAKONDA REDDY	1	52	4	5	1	2		2	1	1	5	2	HM	1	120	4	6*4	3	1	1	1	1,2,5
207	RAMACHANDRAN P.	1	55	4	3	2	2		2	1	2	5	2	6 60	1	143	2	3*2	2	2	2	2	1
208	GOVINDARAJAN S.	1	65	5	2	2	2		2	4	1	5	2	FCF	1	146	4	5*5	2	2	1	1	1,2,5
209	NOORJAHAN H.	2	34	2	1	1	1	1	2	4	1	5	2	6 36	1	207	3	4*3	2	2	1	2	1,2
210	MOHAN R.	1	50	3	3	1	2		2	4	1	5	2	HM	1	158	4	5*4	3	1	1	2	1,2
211	GOPINATH K.	1	56	4	2	1	2		2	2	1	5	1	6 12	1	130	1	3*3	2	2	1	1	1
212	AMIRTHAM S.	2	50	3	2	2	2		2	4	1	5	2	6 24	1	117	2	3*2	2	2	2	2	1
213	SULOCHANA K	2	40	2	1	2	1	2	2	1	1	5	2	6 60	1	125	2	4*4	3	2	1	2	1,5
214	RASU K.	1	56	4	1	2	2		2	4	1	5	1	6 60	1	115	3	4*3	2	2	1	1	1,5
215	MANICKAM M	1	50	3	1	2	2		2	4	1	5	2	6 24	1	125	2	3*2	2	2	1	1	1
216	PANJAVARNAM R.	2	60	4	1	2	1	3	2	1	2	5	2	6 60	1	100	3	4*4	2	2	2	1	1,5
217	LAKSHMI S.	2	40	2	1	1	2		2	4	1	5	2	5 60	1	110	3	3*2	2	2	1	1	1
218	VALLIAPPAN P.	1	51	4	2	2	2		2	4	1	5	2	6 60	1	118	2	3*3	2	2	1	2	1
219	MURUGAN S.	1	70	5	2	1	1	1	2	4	1	5	2	HM	1	84	4	5*5	3	1	1	2	1,2,5
220	SOUNDARAJAN K.	1	65	5	1	1	2		2	2	1	5	2	6 60	1	84	3	3*3	2	2	1	2	1,2
221	PALANIAMMAL	2	52	4	1	1	2		2	4	1	5	2	6 9	1	95	2	2*2	2	2	1	1	1
222	CHINNAMMAL V.	2	42	3	1	1	1	3	2	4	1	5	2	6 36	1	120	2	3*2	2	2	1	1	1,5
223	POUN M.	2	60	4	2	2	2		2	3	1	5	2	6 9	1	82	2	2*2	2	2	2	2	1
224	ANTONY DOSS A.	1	40	2	1	2	2		2	4	1	5	2	6 60	1	117	2	3*3	2	2	1	2	1,3
225	KALIYATHAL K.	2	55	4	2	2	2		2	1	2	5	1	5 60	1	97	3	3*3	2	2	1	1	1
226	VIJAYAMMA	2	54	4	1	1	1	2	2	4	1	1	2	HM	1	84	4	5*4	3	1	1	1	1,2,5
227	VALLIAMMAL K.	2	53	4	2	2	2		2	4	1	5	2	6 60	1	90	2	3*3	2	2	1	2	1
228	MARIAPPAN P.	1	55	4	1	1	2		2	2	1	5	1	6 18	1	151	2	3*2	2	2	1	1	1
229	VIJAYALAKSHMI A.	2	32	2	3	2	2		2	1	1	5	2	6 36	1	86	3	3*2	2	2	1	2	1,5
230	VEL MURUGAN	1	23	1	1	2	1	1	2	2	1	5	2	6 24	1	106	2	2*2	2	2	2	1	1,5
231	PALANISAMY V.	1	60	4	1	2	2		2	4	1	5	2	6 36	1	97	2	2*3	2	2	1	1	1,5
232	MURASOLI R.	1	42	3	2	1	2		2	4	1	5	2	FCF	1	81	4	6.5*3.5	3	1	1	2	1,2,5
233	POTTU M.	2	44	3	1	2	1	3	2	4	1	5	2	HM	1	80	3	6*7	3	1	1	2	1,2,5
234	RAYAPPAN S.	1	52	4	3	1	1	6	2	2	2	5	2	6 60	1	120	2	2*2	2	2	1	1	1,5
235	MEENA R.	2	55	4	2	2	2		2	4	1	5	2	5 60	1	172	2	3*4	2	2	1	1	1,2
236	SUBBULAKSHMI S.	2	45	3	1	1	1	5	2	4	1	5	2	HM	1	145	4	6*4	3	2	2	2	1,2,5
237	VENKATAIAH P.	1	62	5	1	1	2		2	1	1	5	2	6 24	1	200	2	2*2	2	2	1	2	1,2
238	MUSALAIAH V.	1	55	4	3	1	2		2	4	1	5	2	6 60	1	114	2	2*3	2	2	1	1	1,5

239	SUBRAMANIYAM ACHARI K.	1	50	3	1	1	1	4	2	4	1	5	2	6 12	1	120	1	1*1	2	2	1	1	1
240	MURUGATHAL V.	2	60	4	1	2	2		2	1	2	5	2	6 60	1	150	2	3*3	2	2	1	2	1,5
241	MARIYA AROCKIAM K.	2	50	3	1	1	1	1	2	4	1	4	1	PL	1	100	4	5*4	4	1	1	1	1,2,5
242	THAYAMMAL C.	2	62	5	1	2	2		2	2	1	5	2	5 60	1	250	3	3*3	2	2	1	1	1,5
243	DHANALAKSHMI K.	2	27	1	1	2	2		2	3	1	5	2	5 60	1	178	3	3*2	2	2	1	2	1
244	PANDIAN M.	1	40	2	2	1	1	2	2	4	1	5	1	5 60	1	190	4	4*4	2	2	2	2	1,5
245	DAGGUPATI SUBBAIAH	1	60	4	3	2	2		2	4	1	5	2	5 60	1	187	2	5*3	3	2	1	1	1,5
246	SRIDHAR R.	1	50	3	1	1	2		2	4	1	5	2	6 60	1	112	2	4*3	2	2	1	1	1,2
247	BOPPANA CHINA VENKATESWARLU	1	55	4	1	2	1	3	2	1	2	5	2	6 36	1	170	4	2*2	2	2	1	1	1
248	CHELLATHAL K.	2	62	5	1	2	2		2	4	1	5	2	6 36	1	98	3	2*2	2	2	1	1	1
249	NATESAPILLAI T.	1	64	5	1	2	1	1	2	2	1	5	2	6 24	1	104	2	2*2	2	2	1	1	1
250	SANKARALINGAM I.	1	60	4	1	2	2		2	4	1	5	2	6 60	1	78	3	4*2	2	2	1	1	1,2
251	CHINNAPILLAI R.	2	50	3	1	1	2		2	4	1	5	2	6 60	1	86	2	2*2	2	2	1	1	1
252	CHINNAMMAL S.	2	52	4	1	1	2		2	4	1	5	2	6 18	1	90	2	2*1	2	2	1	2	1
253	KUMAR M.	1	22	1	4	1	1	1	2	4	1	5	2	6 36	1	98	3	2*2	2	2	1	1	1,5
254	AYYAKALAI	1	60	4	2	2	2		2	1	1	5	2	6 36	1	186	3	2*3	2	2	1	1	1,5
255	KATHAMMAL N.	2	55	4	3	2	2		2	4	2	5	2	HM	1	80	4	5*5	3	1	1	2	1,2,5
256	NAGARAJ R.	1	40	2	1	2	2		2	4	1	5	2	6 60	1	86	2	2*3	2	2	1	2	1,2
257	VIJAYALAKSHMI B.	2	52	4	1	1	1	2	2	4	1	5	1	5 60	1	124	3	3*3	2	2	1	2	1,5
258	SELVARAJ	1	50	3	1	1	2		2	3	1	5	2	2 60	1	115	4	4*4	3	2	2	1	1,2,5
259	RAJENDRAN T.	1	45	3	1	1	1	3	2	2	1	1	2	PL	1	82	4	5*6	3	2	1	2	1,2,5
260	PANJAVARNAM R.	2	55	4	1	2	2		2	4	1	5	1	1 60	1	117	4	4*6	3	1	1	1	1,2,5
261	SENTHAMARAI KANNAN R.	1	42	3	2	1	1	1	2	4	1	5	2	6 60	1	97	4	3*3	2	2	1	1	1,2
262	PERUMAL K.	1	47	3	1	2	2		2	4	1	5	2	1 60	1	84	4	5*4	3	2	1	2	1,2,5
263	SEETHAIYAMMAL R.	2	52	4	1	1	2		2	4	1	5	2	6 36	1	90	2	3*2	2	2	1	2	1,5
264	IBRAHIM SHA S.	1	59	4	1	2	1	3	2	1	2	5	2	6 12	1	151	2	2*1	2	2	1	1	1
265	NAGAMMA N.	2	62	5	1	1	2		2	4	1	5	2	6 24	1	86	2	1*1	2	2	1	1	1
266	MANI R.	1	64	5	1	2	2		2	4	1	5	2	1 60	1	106	4	6.5*3.5	3	2	1	1	1,2,5
267	RAVICHANDRAN	1	58	4	2	2	2		2	1	1	5	2	6 60	1	97	2	3*3	2	2	1	1	1,2
268	ARUMUGAM A.	1	50	3	3	2	2		2	4	1	5	2	6 18	1	81	3	1*1.5	2	2	1	1	1
269	DHASTHAGIRI G.	1	60	4	2	1	1	2	2	4	2	5	2	6 36	1	80	2	3*3	2	2	1	1	1
270	TAJ NISHA.H	2	30	1	1	2	2		2	1	1	5	2	6 24	1	72	2	2*2	2	2	1	1	1,5
271	POLA SETTI KOTTESWARA RAO	1	61	5	1	1	2		2	4	1	5	2	6 60	1	80	2	5*6	3	2	1	2	1,5
272	MURUGANATHAN	1	52	4	1	1	2		2	4	1	5	2	HM	1	115	4	6*6	3	1	2	2	1,2,5
273	THIRUMURUGAN T.	1	50	3	1	1	1	1	2	4	1	5	1	6 60	1	118	3	3*3	2	2	2	1	1,5
274	MUTHURAJ A.	1	55	4	1	2	2		2	4	1	5	2	6 18	1	130	1	2*1	2	2	1	1	1
275	NAMBURANI P.	2	45	3	1	1	2		2	3	1	5	2	6 36	1	144	2	2*2	2	2	1	2	1,5
276	DHANALAKSHMI M.	2	60	4	2	2	2		2	4	2	5	1	6 18	1	180	1	2*3	2	2	1	1	1,5
277	SEENIVASAN T.	1	40	2	2	1	1	3	2	4	1	5	2	6 24	1	120	2	2*1	2	2	1	2	1
278	RABIYA M.	2	30	1	2	2	2		2	4	1	5	2	6 60	1	114	3	3*3	2	2	1	1	1,2
279	IRULRAJA P.	1	52	4	1	1	1	3	2	2	1	5	2	6 36	1	100	2	2*2	2	2	1	1	1,5
280	MUNIAMMAL K.	2	44	3	1	2	1	3	2	4	1	5	2	HM	1	82	4	6*5	3	1	1	2	1,2,5
281	MOOKKAMMAL	2	56	4	1	2	2		2	4	1	5	2	6 60	1	117	2	3*3	2	2	1	2	1,2
282	NEELA MEGAM M.	1	34	2	1	2	1	1	2	4	1	5	2	6 18	1	97	2	3*3	2	2	1	1	1
283	KADIRI NAGAMMA	2	59	4	1	1	2		2	2	1	5	2	6 36	1	84	3	3*3	2	2	1	1	1,3
284	ANDAL	2	57	4	1	1	2		2	4	2	5	2	PL	1	90	4	5*6	3	1	1	2	1,2,5
285	SIVARAMAN K.	1	60	4	1	1	1	3	2	4	1	5	2	HM	1	151	4	5*4	3	1	1	1	1,2,5
286	MURUGAIAH	1	55	4	1	1	2		2	3	1	5	2	6 60	1	86	3	3*2	2	2	1	1	1,2
287	ELUMALAI A.	1	50	3	1	1	2		2	4	1	5	2	5 60	1	106	4	4*4	2	2	2	1	1,2
288	RAMASAMY V.	1	44	3	1	2	2		2	1	1	5	2	5 60	1	97	2	4*3	2	2	1	1	1,5
289	KANNADASAN S.	1	60	4	1	1	1	2	2	4	1	1	1	PL	1	82	4	6*7	3	2	1	2	1,2,5
290	PARIMALA	2	38	2	2	2	2		2	4	1	5	2	6 60	1	117	2	4*4	3	2	1	1	1,2
291	ESWARI V.	2	45	3	1	1	2		2	4	1	5	2	6 60	1	97	3	3*3	2	2	1	1	1,5
292	BALAKRISHNAN D.	1	60	4	1	2	1	3	2	4	1	5	1	2 60	1	84	2	4*4	2	2	1	2	1,2,5
293	MALAR KODI J.	2	54	4	1	1	1	4	2	1	2	5	2	PL	1	90	4	5*5	3	2	1	2	1,2,5
294	KALIAMAML P.	2	50	3	1	2	2		2	4	1	5	2	6 9	1	151	1	1*1	2	2	1	2	1

295	MATHAMMAL V.	2	65	5	1	2	2		2	1	1	5	2	6 36	1	86	3	2*2	2	2	1	1	1
296	MARIAMMAL S.	2	55	4	1	2	2		2	4	1	5	2	6 24	1	106	2	3*2	2	2	1	2	1,5
297	PALANISAMY	1	48	3	2	1	1	1	2	4	1	5	2	6 24	1	97	2	4*4	2	2	1	1	1,5
298	MAYANDI R.	1	58	4	2	1	1	6	2	2	1	5	2	6 60	1	81	3	5*3	3	2	1	1	1,2
299	MAHALINGAM M.	1	57	4	3	1	2		2	4	2	5	2	HM	1	80	4	6*6	3	1	1	2	1,2,5
300	MAHALINGAM M.	1	37	2	1	1	2		2	4	2	5	2	6 24	1	110	2	2*1	2	2	1	1	1,5
301	NAGAMMA K.	2	60	4	1	2	1	3	2	4	1	5	2	6 12	1	143	1	1*1	2	2	1	1	1
302	KANNAN D.	1	48	3	1	2	2		2	4	2	5	2	6 18	1	146	2	1.5*1.5	2	2	1	2	1
303	KALIMUTHU M.	1	57	4	1	2	1	4	2	4	1	5	2	HM	1	207	4	5*3	4	1	1	2	1,2,5
304	NITHISH KUMAR S.	1	46	3	1	2	2		2	2	1	5	2	6 60	1	158	4	3*3	2	2	1	1	1,5
305	LAKSHMI R.	2	60	4	2	1	1	1	2	4	1	4	2	6 18	1	130	2	2*2	2	2	1	2	1
306	SASTIVEL M.A.	1	40	2	2	1	2		2	4	1	5	2	6 36	1	117	2	2*2	2	2	1	2	1,2
307	RAJU A.	1	64	5	1	2	2		2	4	1	5	1	6 18	1	125	2	2*2	2	2	1	1	1
308	AYOTHI RAMAN K.	1	51	4	1	1	2		2	2	1	5	2	6 12	1	115	2	2*1	2	2	1	1	1
309	BALAMURUGAN G.	1	42	3	1	2	1	3	2	2	1	5	2	HM	1	125	4	6*4	3	1	1	2	1,2,5
310	PETCHIAMMAL	2	60	4	1	2	2		2	4	2	5	1	6 60	1	100	3	4*4	3	2	1	1	1,5
311	SUBBAIAH M	1	40	2	1	2	2		2	4	1	5	2	6 18	1	110	2	3*2	2	2	1	1	1
312	NALLAMMAL .R	2	55	4	2	1	2		2	3	1	5	2	6 36	1	118	3	3*3	2	2	1	1	1
313	SEENIAMMAL K.	2	53	4	1	1	1	2	2	3	1	2	2	3 60	1	84	4	4*5	2	2	1	1	1,5
314	DEIVANAI	2	59	4	1	1	2		2	4	2	5	2	6 24	1	84	2	2*2	2	2	2	2	1
315	LAKSHMI J.	2	57	4	1	1	2		2	4	1	5	2	6 60	1	95	2	2*2	2	2	1	2	1,5
316	VADIVEL P.	1	45	3	1	2	1	6	2	4	2	5	2	6 36	1	120	2	3*3	2	2	1	1	1,5
317	MADHUSUDHAN	1	49	3	1	2	2		2	4	1	5	1	3 60	1	82	3	5*6	3	2	1	1	1,2,5
318	RASU E.	1	51	4	1	2	1	3	2	4	1	5	2	6 60	1	117	3	2*2	2	2	1	2	1,2
319	SANGEETHA R.	2	26	1	1	1	2		2	4	1	5	2	6 18	1	97	2	2*1	2	2	1	2	1,5
320	SUBBARAYUDU	1	44	3	2	2	1	1	2	4	1	5	2	6 36	1	143	2	4*3	2	2	2	1	1
321	BOSE	1	60	4	3	2	2		2	1	1	5	2	1 60	1	146	4	5*5	3	1	1	1	1,2,5
322	MURUGATHAL M.	2	55	4	1	2	1	2	2	2	1	5	2	6 60	1	207	3	3*3	2	2	1	2	1,3
323	ALAGAN L.	1	45	3	1	2	2		2	4	1	5	2	3 60	1	158	3	4*4	2	2	1	1	1,2
324	NATARAJAN R.	1	40	2	1	1	2		2	3	2	5	2	6 18	1	130	1	1*1	2	2	1	1	1
325	PAKKIRAMMA	2	60	4	1	1	1	4	2	4	1	5	2	HM	1	117	4	5*5	3	2	1	2	1,2,5
326	THATHAR GOUNDAR	1	35	2	1	2	2		2	4	1	5	2	6 60	1	125	3	2*2	2	2	1	2	1
327	PITCHAIAMMAL G.	2	54	4	2	1	1	2	2	4	1	5	2	6 18	1	115	2	2*1	2	2	1	1	1
328	GANGA BHAVANI	2	42	3	1	2	1	5	2	4	1	5	2	6 36	1	125	2	2*2	2	2	1	1	1
329	PONNAMMAL R.	2	62	5	1	2	2		2	1	1	5	2	6 18	1	100	2	1*1	2	2	1	1	1
330	BALKEES BEEVI	2	55	4	1	2	2		2	4	1	5	2	6 12	1	110	2	1*2	2	2	1	1	1
331	SUNTHARI	2	49	3	1	1	1	1	2	4	1	5	1	HM	1	118	4	5*5	3	1	1	1	1,2,5
332	CHINNA SUBBAIAH T.	1	52	4	1	1	1	6	2	4	2	5	2	6 60	1	84	3	3*3	2	2	1	1	1,2
333	AMSATHAL K.	2	48	3	2	1	2		2	1	1	5	2	6 18	1	84	2	2*2	2	2	1	1	1
334	MURUGAN	1	55	4	1	1	2		2	4	1	5	1	6 36	1	95	3	2*3	2	2	2	2	1,2
335	THANGARAJ A.	1	65	5	2	2	1	2	2	4	2	5	2	6 18	1	120	2	2*1	2	2	1	1	1
336	ANEESH SIVANANDAN	1	28	1	3	2	2		2	4	2	5	2	6 24	1	82	2	2*2	2	2	1	1	1
337	BALAYAPALLI SUJATHA	2	24	1	1	2	2		2	4	1	5	2	6 60	1	117	2	2*2	2	2	1	1	1,5
338	PAPPAYEE	2	45	3	1	2	2		2	4	2	5	2	6 36	1	97	2	2*2	2	2	1	2	1,5
339	KUPPUSWAMI C.	1	62	5	4	2	1	1	2	4	1	1	2	HM	1	84	4	5*6	3	2	1	2	1,2,5
340	RAVI D.	1	40	2	2	2	2		2	4	1	5	2	6 60	1	143	2	2*2	2	2	1	1	1,2
341	SURIYAKALA K	2	60	4	2	2	2		2	4	1	5	1	6 18	1	146	3	1*1	2	2	1	1	1,2
342	SANGARA NARAYANAN S.	1	55	4	3	1	1	1	2	4	1	5	2	6 36	1	207	2	2*2	2	2	1	2	1
343	PENCHALAIAH	1	54	4	1	1	2		2	4	1	5	2	1 60	1	158	4	4*5	3	1	1	2	1,2,5
344	THANGA RAJ	1	51	4	1	2	2		2	2	1	5	2	4 60	1	130	4	4*4	2	2	1	1	1,2,5
345	KRISHNAVENI S.	2	35	2	1	1	1	3	2	4	1	5	2	6 24	1	117	2	2*2	2	2	1	2	1,2
346	MUTHUSAMY M.	1	46	3	1	2	2		2	4	1	5	2	6 60	1	125	2	2*2	2	2	1	2	1,2
347	PAPPA R.	2	53	4	1	2	2		2	4	1	5	2	PL	1	115	4	5*4	3	1	1	1	1,2,5
348	MURUGAN V.	1	42	3	2	2	1	1	2	1	1	5	2	6 24	1	125	2	2*2	2	2	2	1	1,2
349	ASWATHI KIRUBAA	2	45	3	1	1	2		2	4	1	5	2	6 60	1	100	3	3*3	2	2	1	1	1,2
350	PANCHAVARNAM	2	55	4	1	1	1	4	2	4	2	5	2	5 60	1	110	3	3*3	2	2	1	1	1
351	LAKSHMI A	2	60	4	1	1	2		2	3	1	5	2	6 60	1	118	2	3*2	2	2	1	1	1,2
352	BYROS KHAN R	1	50	3	1	1	1	1	2	4	1	5	2	HM	1	84	4	5*5	3	1	1	2	1,2,5
353	JANGAM REDDY	1	35	2	1	2	2		2	4	2	5	2	6 60	1	84	3	2*2	2	2	1	1	1

354	ALAGAMMAL	2	54	4	2	2	2		2	4	2	5	2	6 18	1	95	2	2*2	2	2	1	2	1
355	ANANTHAN R.	1	44	3	1	2	2		2	4	1	5	1	6 36	1	120	2	2*2	2	2	1	1	1
356	MUTHAMMAL M.	2	60	4	4	2	1	1	2	4	2	5	2	6 24	1	82	2	2*1	2	2	1	1	1,2
357	CHANDRASEKARAN K.	1	42	3	1	2	2		2	4	1	5	2	6 60	1	117	3	2*2	2	2	1	1	1
358	VIVEKANANDAN G.	1	62	5	1	2	2		2	4	1	5	1	5 60	1	97	3	2*3	2	2	1	2	1,5
359	AJITH S.	1	25	1	4	1	2		2	4	1	5	2	2 60	1	143	4	3*3	2	2	1	2	1,5
360	SUBBAMMA	2	46	3	1	1	1	1	2	4	1	5	2	6 60	1	146	3	3*3	2	2	1	1	1,2
361	MURUGESAN K	1	55	4	2	2	2		2	4	1	5	2	6 18	1	207	2	2*2	2	2	1	1	1
362	DHANAPALAN P.	1	45	3	2	1	2		2	4	1	5	2	6 36	1	158	2	2*2	2	2	2	2	1
363	ABISHEK M.	1	60	4	3	2	2		2	4	1	5	2	6 24	1	130	2	2*1	2	2	2	1	1
364	RASATHI	2	40	2	1	2	1	1	2	1	1	5	2	6 24	1	117	2	2*2	2	2	1	1	1,5
365	THANGAM G.	2	65	5	1	2	2		2	4	1	5	1	6 60	1	125	2	3*2	2	2	1	2	1,5
366	RAMAR P.	1	51	4	1	1	2		2	3	1	5	2	6 60	1	115	3	3*1.5	2	2	1	2	1,2
367	MURUGAPPAN	1	45	3	1	1	1	4	2	4	1	5	2	6 24	1	125	3	2*2	2	2	1	1	1
368	SUBRAMANI R.	1	60	4	1	1	2		2	4	1	5	2	6 60	1	100	2	3*2	2	2	1	1	1,2
369	RAM THAI	2	67	5	2	1	1	1	2	2	2	5	2	5 60	1	110	3	3*2	2	2	1	1	1,5
370	THANKA R.	1	55	4	2	2	2		2	4	1	5	2	6 36	1	118	2	2*2	2	2	1	1	1,5
371	ALAGUTHAI.R	2	60	4	1	2	2		2	4	1	5	2	HM	1	84	4	5*5	3	2	1	1	1,2,5
372	MUTHU MURUGAN K.	1	51	4	1	2	2		2	1	2	5	2	6 60	1	84	2	2*2	2	2	1	1	1
373	PITCHAI A.	1	55	4	1	2	1	1	2	4	2	5	2	4 60	1	95	4	3*5	2	2	1	1	1,2,5
374	AMEENA J.	2	27	1	1	2	2		2	4	1	5	2	6 36	1	120	2	2*2	2	2	1	2	1
375	RAVI K.	1	46	3	1	2	2		2	4	2	5	2	6 24	1	82	2	2*3	2	2	1	1	1
376	YANAMALA LAKSHMI NARAYANA	2	55	4	2	2	2		2	2	1	5	2	6 60	1	117	3	3*3	2	2	2	1	1,5
377	SAKTHIVEL M.	1	35	2	1	1	1	2	2	4	1	2	2	5 60	1	97	2	3*3	2	2	1	1	1,5
378	LAKSHMI DEVI	2	45	3	1	1	2		2	4	1	5	2	6 60	1	84	2	2*2	2	2	1	2	1
379	MATHAVANAI P.	2	55	4	1	2	2		2	4	1	5	1	6 60	1	143	2	3*3	2	2	1	2	1,5
380	RAJAMANICKAM	1	60	4	1	1	1	1	2	4	1	5	2	6 18	1	146	1	1*1	2	2	1	1	1
381	RATHINAM S.	2	50	3	1	2	2		2	4	1	5	2	6 36	1	207	3	2*2	2	2	1	1	1,2
382	JEYA PRAKASH R.	1	36	2	3	2	1	6	2	2	1	5	1	6 24	1	158	2	2*2	2	2	1	2	1,2
383	ANANDHARAJ L.	1	56	4	2	2	2		2	1	1	5	2	6 24	1	130	2	2*2	2	2	1	1	1
384	RAMANAIAH	1	48	3	2	1	1	1	2	4	1	5	2	6 60	1	117	2	2*1	2	2	1	1	1,5
385	SAMI	1	59	4	3	1	2		2	4	1	5	2	6 60	1	125	3	3*2	2	2	1	2	1
386	TAMILARASAN P.	1	44	3	1	1	2		2	4	1	5	2	6 24	1	115	2	2*2	2	2	1	2	1,2
387	ALAGU VEL	1	36	2	1	1	2		2	4	1	5	2	6 60	1	125	2	2*2	2	2	1	1	1
388	SHANMUGARAJ S.	1	54	4	1	2	1	1	2	2	2	5	2	5 60	1	100	3	3*3	2	2	1	1	1,5
389	MEENA S.	2	48	3	1	2	2		2	1	1	5	1	6 18	1	110	1	2*1	2	2	1	1	1
390	AYYAKANNU V	1	57	4	1	2	2		2	4	1	5	2	HM	1	118	4	5*5	3	1	2	2	1,2,5
391	MOHAN RAJ	1	50	3	1	2	2		2	4	2	5	2	6 60	1	84	4	3*2	2	2	1	1	1
392	GOVINDHARASU G.	1	55	4	1	1	1	1	2	2	2	5	2	6 18	1	84	2	2*2	2	2	2	1	1
393	SILVAR STAR S	1	40	2	1	1	2		2	4	1	5	2	6 36	1	95	2	4*5	2	2	1	1	1,5
394	BANDISELLA BRAMAIAH	1	63	5	1	2	2		2	4	2	5	2	6 24	1	120	2	2*2	2	2	1	2	1
395	YOGESHWARAN	1	52	4	1	1	2		2	4	1	5	2	6 60	1	82	3	2*2	2	2	1	1	1
396	PANCHAVARNAM	2	50	3	2	2	1	1	2	3	1	5	2	5 60	1	143	3	3*2	2	2	1	1	1,5
397	IRUDHAYARAJ S.	1	55	4	1	2	2		2	4	1	5	2	PL	1	146	4	5*6	3	1	1	2	1,2,5
398	VADIVEL C.	1	32	2	2	2	2		2	4	1	5	2	6 60	1	207	3	2*3	2	2	1	2	1
399	ALAGAMMAL C.	2	54	4	1	1	1	6	2	4	1	5	2	6 18	1	158	3	2*1	2	2	1	2	1
400	MURUGESWARI R.	2	58	4	1	1	1	2	2	1	1	5	2	6 36	1	130	2	2*2	2	2	1	1	1,5
401	GURUMURUGAN B.	1	55	4	1	1	2		2	4	1	5	2	6 9	1	117	1	1*1	2	2	1	1	1
402	CHINNAMMAL R.	2	25	1	1	2	1	4	2	1	2	5	2	6 24	1	125	2	2*2	2	2	1	1	1
403	SHAIK KHADAR MASTAN	1	60	4	1	2	2		2	4	1	5	1	6 12	1	115	2	2*1	2	2	1	2	1
404	LAKSHMI M.	2	50	3	2	2	1	1	2	4	1	5	2	6 60	1	125	3	2*2	2	2	2	1	1,5

		3 WEEKS						1 MONTH						3 MONTHS						
STUDY NO	NAME	V/A	RX	IMPRESSION	PERFORATION	IMPENDING PERFORATION	TPK DONE	V/A	RX	IMPRESSION	PERFORATION	WORSENING OF ULCER	TPK DONE	V/A	SCAR SIZE	IMPRESSION	HEALED WITH SINGLE DRUG	HEALED WITH TWO DRUGS A	HEALED WITH TWO DRUGS B	HEALED WITH MORE THAN TWO DRUGS
1	CHANDRA DEVI	6 60	1,2	2	2			6 24	1,2	2	2			6 24	3*3	1		1		
2	PIDARI	6 36	1	2	2			6 18	1	2	2			6 18	1*2	1	1			
3	PANJAVARNAM	1 60	1,2,5	2	2			1 60	1,2,5	2	2			1 60	6*6	1				1
4	CHANDRAN A	6 9	1	1	2			6 9	1	1	2			6 9	1*2	1	1			
5	CHINNA	6 60	1,5	2	2			6 24	1,5	2	2			6 24	3*3	1			1	
6	BALASUBRAMANI S	1 60	1,2,5	4	2	**1**	1	1 60	1,2,5	4	**1**			1 60	0	4				0
7	NAGAMMA	6 36	1,5	2	2			6 36	1,5	2	2			6 36	4*3	1			1	
8	ANWAR BATCHA	6 24	1	2	2			6 9	1	2	2			6 9	1*2	1	1			
9	VALLIAMMAI G	6 9	1	1	2			6 9	1	1	2			6 9	1*2	1	1			
10	KALIAMMAL S	6 60	1,5	2	2			6 36	1,5	2	2			6 24	3*3	1			1	
11	PRITHVIRAJ C	5 60	1	2	2			6 36	1	2	2			6 18	2*3	1	1			
12	MUNIYASAMY	3 60	1,2	2	2			6 60	1,2	2	2			6 60	5*5	1		1		
13	VEERANAN A	6 60	1,5	2	2			6 60	1,5	2	2			6 36	2*3	1			1	
14	SUBBAIAH P	6 36	1	2	2			6 18	1	2	2			6 18	1*2	1	1			
15	SEENI S	6 12	1,5	2	2			6 9	1,5	2	2			6 9	1*2	1			1	
16	MURUGAN M	6 60	1,5	2	2			6 24	1,5	2	2			6 24	2*2	1			1	
17	RACKKI A	1 60	1,5	2	2			1 60	1,5	2	**1**		1	1 60	0	3			0	
18	JILANI	PL	1,2	4	**1**		1	PL	1,2	4	**1**			PL	0	4		0		
19	RAJU S	4 60	1,2	3	2			6 60	1,2	3	2			6 60	5*5	1		1		
20	CHINNAIAH D	6 36	1,5	2	2			6 24	1,5	2	2			6 24	2*2	1			1	
21	ALAGARSAMY	6 60	1,2,5	2	2			6 36	1,2,5	2	2			6 36	4*4	1				1
22	MALLIKA C	6 36	1	2	2			6 36	1	2	2			6 36	2*2	1	1			
23	UMADEVI	6 9	1	1	2			6 9	1	1	2			6 9	1*2	1	1			
24	POOPANDI	6 6	1	1	2			6 6	1	1	2			6 6	1*1	1	1			
25	SUKHIBAI	6 60	1,5	2	2			6 24	1,5	2	2			6 24	2*3	1			1	
26	CHINNAPONNU	6 60	1,5	2	2			6 36	1,5	2	2			6 36	4*4	1			1	
27	CHINNAKARUPPAN	6 12	1	2	2			6 9	1	2	2			6 9	2*1	1	1			
28	SAIKUMAR K	6 60	1,5	2	2			6 60	1,5	2	2			6 60	5*6	1			1	
29	MUTHUSAMY P	HM	1,2,5	4	2	**1**	1	HM	1,2,5	4	2			HM	0	4				0
30	HARINATH M	6 60	1,5	2	2			6 24	1,5	2	2			6 24	5*5	1			1	
31	VIGNESH M	6 24	1	2	2			6 24	1	2	2			6 24	3*3	1	1			
32	KARUPPATHAL N	1 60	1,5	2	2			1 60	1,5	2	2			1 60	6*6	1			1	
33	MUNIYAPPAN R	6 9	1	2	2			6 9	1	2	2			6 9	2*2	1				
34	MADASAMY M	HM	1,2	4	**1**		1	HM	1,2	4	**1**			HM	0	4		0		
35	CHINNAIAH P L	6 60	1	2	2			6 24	1	2	2			6 24	2*2	1	1			
36	RAJIYA BEGUM A	6 9	1	1	2			6 6	1	1	2			6 6	1*1	1	1			
37	THIRUMALAI V	6 12	1,5	2	2			6 9	1,5	2	2			6 9	2*2	1			1	
38	MUTHURAJ A	PL	1,2,5	4	**1**		1	PL	1,2,5	4	**1**			PL	0	4				0
39	RUCKMANI P	6 36	1	2	2			6 36	1	2	2			6 36	3*3	1	1			
40	KANNAN A	6 12	1	2	2			6 12	1	2	2			6 12	2*2	1	1			
41	MANI M	6 6	1	1	2			6 6	1	1	2			6 6	1*1	1	1			
42	VENKATA SUBBAREDDY	6 24	1	2	2			6 24	1	2	2			6 24	3*2	1	1			

43	PONNAN T	6 12	1,5	2	2			6 12	1,5	2	2			6 12	2*2	1			1	
44	SHANTHI S	6 60	1,5	2	2			6 36	1,5	2	2			6 36	2*3	1			1	
45	SHANTHI S	6 24	1	2	2			6 12	1	2	2			6 12	2*2	1	1			
46	MAYILATHAL	6 36	1,5	2	2			6 18	1,5	2	2			6 18	4*3	1			1	
47	NAGARAJU	6 18	1	2	2			6 12	1	2	2			6 12	2*2	1	1			
48	MARIAMMAL K	6 9	1	1	2			6 9	1	1	2			6 9	1*1	1	1			
49	ESWARAIAH N	6 60	1	2	2			6 24	1	2	2			6 24	3*2	1	1			
50	RAMANA G	6 36	1	2	2			6 36	1	2	2			6 36	3*2	1	1			
51	MARIAMMAL R	6 60	1,5	3	2			6 60	1,5	3	2			6 60	3*2	1			1	
52	MUTHU K	6 60	1,5	2	2			6 60	1,5	2	2			6 60	3*3	1			1	
53	SUBRAMANIAN S	6 60	1,5	2	2			6 60	1,5	2	2			6 60	4*4	1			1	
54	SUBRAMANI V	6 12	1,5	2	2			6 12	1,5	2	2			6 12	2*2	1			1	
55	SURESH KUMAR M	6 36	1	3	2			6 18	1	3	2			6 18	2*2	1	1			
56	RAMU U	6 12	1	2	2			6 12	1	2	2			6 12	2*1	1	1			
57	SINGARAVEL P	6 12	1,5	2	2			6 12	1,5	2	2			6 12	2*2	1			1	
58	SIVAPPURAJA T	6 9	1,2	2	2			6 9	1,2	2	2			6 9	2*1	1		1		
59	CHINNAMMAL E	HM	1,2,5	4	**1**		1	HM	1,2,5	4	**1**			HM	0	4				0
60	VENKATALAKSHMI	6 36	1	2	2			6 24	1	2	2			6 24	2*2	1	1			
61	PENCHALAIAH	PL	1,2,5	4	**1**		1	PL	1,2,5	4	**1**			PL	0	4				0
62	AMARAVATHI K	6 12	1,2	2	2			6 9	1,2	2	2			6 9	2*2	1		1		
63	JEYANTHI P	6 60	1,5	2	2			6 24	1,5	2	2			6 24	3*2	1			1	
64	SANKAR V	6 12	1,5	2	2			6 12	1,5	2	2			6 12	2*1	1			1	
65	MOHAN V	6 36	1,5	2	2			6 36	1,5	2	2			6 36	2*2.5	1			1	
66	MURUGAN K	6 60	1,2,5	1	2			6 60	1,2,5	1	2			6 60	2*3	1				1
67	MONICKA	6 18	1	2	2			6 18	1	2	2			6 18	2*1	1	1			
68	MUTHULAKSHMI S	6 60	1,2	3	2			6 36	1,2	3	2			6 36	2*2	1		1		
69	GANESAN N	6 9	1,5	1	2			6 9	1,5	1	2			6 9	2*1	1			1	
70	PAPPATHI A	5 60	1,5	3	2			6 60	1,5	3	2			6 60	2*2	1			1	
71	UNNAMALAI	6 12	1,5	2	2			6 9	1,5	2	2			6 9	2*2	1			1	
72	MUNIYAMMAL M	6 60	1,2,5	2	2			6 60	1,2,5	2	2			6 60	2*2	1				1
73	TAMILSELVI U	6 6	1	1	2			6 6	1	1	2			6 6	2*1	1	1			
74	ARUNA M	6 9	1,5	1	2			6 9	1,5	1	2			6 9	1*1	1			1	
75	VADIVEL K	5 60	1,5	2	2			6 60	1,5	2	2			6 60	3*2	1			1	
76	PANDIYAN M	6 24	1,5	2	2			6 24	1,5	2	2			6 24	2*2	1			1	
77	NATCHAMMAI C	6 24	1	2	2			6 24	1	2	2			6 24	2*1	1	1			
78	IYAPPAN S	6 18	1	2	2			6 18	1	2	2			6 18	1*1	1	1			
79	ANTHONI SAMY Y	6 60	1,5	2	2			6 60	1,5	2	2			6 60	2*2	1			1	
80	SAHAYA RAJ L	6 24	1,5	2	2			6 12	1,5	2	2			6 12	2*1	1			1	
81	MUKILA M	6 60	1	2	2			6 60	1	2	2			6 60	2*2	1	1			
82	CHELLADURAI M	6 9	1,2	1	2			6 9	1,2	1	2			6 9	2*2	1		1		
83	CHANDRA SEKHAR G	6 9	1	1	2			6 9	1	1	2			6 9	2*1	1	1			
84	RUCKMANI P	6 12	1,2,5	2	2			6 12	1,2,5	2	2			6 12	1*1	1				1
85	PALANIVEL K	6 24	1,5	2	2			6 12	1,5	2	2			6 12	2*1	1			1	
86	MUNEESWARAN N	6 6	1,2,5	1	2			6 6	1,2,5	1	2			6 6	1*1	1				1
87	SEETHALAKSHMI M	6 24	1	2	2			6 18	1	2	2			6 18	1*1	1	1			
88	GOVINDAN V	6 36	1,5	2	2			6 24	1,5	2	2			6 24	2*1	1			1	
89	BOOMI V	6 60	1,2,5	2	2			6 36	1,2,5	2	2			6 36	3*2	1				1
90	GOMATHY C	HM	1,2,5	4	**1**		1	HM	1,2,5	4	**1**			HM	0	4				0
91	KARUPPAYEE N	6 24	1,5	2	2			6 24	1,5	2	2			6 24	2*2	1			1	
92	AMMALU	6 36	1	2	2			6 24	1	2	2			6 24	2*1	1	1			
93	ARUL PRAKASH S	6 12	1,5	2	2			6 12	1,5	2	2			6 12	2*1	1			1	

94	MANI A	6 9	1	1	2			6 9	1	1	2			6 9	1*1	1	1			
95	VENKATESH V	6 60	1	2	2			6 36	1	2	2			6 36	2*2	1	1			
96	KALIDASS M	6 24	1,5	2	2			6 24	1,5	2	2			6 24	2*2	1			1	
97	ARUMUGAM P	6 60	1,5	3	2			6 60	1,5	3	2			6 60	2*2	1			1	
98	KRISHNAN	6 12	1,2	2	2			6 12	1,2	2	2			6 12	2*2	1		1		
99	PITCHAI DEVAR	6 24	1	2	2			6 24	1	2	2			6 24	2*2	1	1			
100	KUMAR S	6 24	1,5	2	2			6 24	1,5	2	2			6 24	2*1	1			1	
101	ARUL DASS D	6 9	1	2	2			6 9	1	2	2			6 9	1*1	1	1			
102	PANDI P	6 36	1,2	2	2			6 18	1,2	2	2			6 18	1*2	1		1		
103	MURUGESAN K	6 18	1	2	2			6 12	1	2	2			6 12	1*2	1	1			
104	MOHAMMED ASMI S	6 24	1	2	2			6 24	1	2	2			6 24	1*1	1	1			
105	SEKAR M	6 36	1,5	2	2			6 18	1,5	2	2			6 18	2*2	1			1	
106	KASIM G	6 24	1	2	2			6 9	1	2	2			6 9	1*1	1	1			
107	ANNAKILI V	6 12	1	2	2			6 12	1	2	2			6 12	2*2	1	1			
108	SANKARAN V	6 24	1	2	2			6 24	1	2	2			6 24	1*1	1	1			
109	RUTHIRA MOORTHY S	6 60	1,5	2	2			6 36	1,5	2	2			6 36	2*2	1			1	
110	KARUKKAVEL I	6 60	1	2	2			6 24	1	2	2			6 24	1*2	1	1			
111	MANIKANDAN K	6 18	1	2	2			6 18	1	2	2			6 18	1*1	1	1			
112	GOVINDAMMAL K	6 24	1,5	2	2			6 12	1,5	2	2			6 12	2*2	1			1	
113	PALANISAMY	PL	1,2,5	4	**1**		1	PL	1,2,5	4	**1**			PL	0	5				0
114	NAGARAJAN R	6 12	1,5	2	2			6 9	1,5	2	2			6 9	2*2	1			1	
115	SEENAIAH V	6 9	1	2	2			6 9	1	2	2			6 9	2*1	1	1			
116	DEVDASS S	6 36	1	2	2			6 36	1	2	2			6 36	1*2	1	1			
117	MARY LAISHA	6 9	1,5	2	2			6 9	1,5	2	2			6 9	3*2	1			1	
118	CHITRA N	6 36	1,2	2	2			6 36	1,2	2	2			6 36	2*2	1		1		
119	PITCHAI KALAI P	6 24	1,5	2	2			6 24	1,5	2	2			6 24	3*4	1			1	
120	RAJANGAM	PL	1,2	4	**1**		1	PL	1,2	4	**1**			PL	0	4		0		
121	ANUSIYA DEVI M	6 12	1	2	2			6 12	1	2	2			6 12	2*2	1	1			
122	RAVICHANDRAN P	6 18	1	2	2			6 18	1	2	2			6 18	2*1	1	1			
123	MUTHUKUMAR R	5 60	1,5	3	2			5 60	1,5	3	2			5 60	3*4	1			1	
124	ARRANGANATHAN R	6 60	1	2	2			6 18	1	2	2			6 18	2*1	1	1			
125	SIVAIAH T	6 24	1,5	2	2			6 24	1,5	2	2			6 24	2*3	1			1	
126	CHINNA DURAI S	6 12	1,2	2	2			6 12	1,2	2	2			6 12	2*2	1		1		
127	SAKILA DEVI A	6 60	1,2	2	2			6 60	1,2	2	2			6 60	3*2	1		1		
128	PONNAMMAL K	6 9	1,2	2	2			6 9	1,2	2	2			6 9	2*2	1		1		
129	ALAGARSAMY S	PL	1,2,5	4	2	**1**	1	PL	1,2,5	4	2			PL	0	4				0
130	PONNANDI V	4 60	1,2,5	3	2			6 60	1,2,5	3	2			6 60	3*3	1				1
131	VINOTH KUMAR I	6 60	1	2	2			6 60	1	2	2			6 60	2*2	1	1			
132	JEYA MANI P	6 24	1,2,5	2	2			6 24	1,2,5	2	2			6 24	2*2	1				1
133	MARIAMMAL P	6 36	1	2	2			6 12	1	2	2			6 12	2*2	1	1			
134	VIVEKANANTHA S	6 60	1	2	2			6 60	1	2	2			6 60	2*3	1	1			
135	GUNASEELAN M	6 36	1,2	2	2			6 18	1,2	2	2			6 18	3*3	1		1		
136	RAMANAMMA C	6 18	1,2	2	2			6 9	1,2	2	2			6 9	2*1	1		1		
137	PANDIAMMAL K	PL	1,2,5	2	**1**		1	PL	1,2,5	2	**1**			PL	0	4				0
138	BALAMANI M	HM	1,2,5	4	2	**1**	1	HM	1,2,5	4	2			HM	0	4				0
139	HAJEE AKBAR M	6 12	1,2	2	2			6 9	1,2	2	2			6 9	1*1	1		1		
140	PALANISAMY C	6 24	1,5	2	2			6 18	1,5	2	2			6 18	2*2	1			1	
141	RAJENDRAN M S	6 60	1,5	2	2			6 24	1,5	2	2			6 24	2*2	1			1	
142	BALAMURUGAN S	6 24	1	2	2			6 24	1	2	2			6 24	2*2	1	1			
143	SEVAGAN A	6 24	1	2	2			6 12	1	2	2			6 12	2*2	1	1			
144	VELAISAMY L	6 18	1,5	2	2			6 18	1,5	2	2			6 18	2*3	1			1	

145	PANCHABATLA VENU	6 6	1,2	1	2			6 6	1,2	1	2			6 6	1*1	1		1		
146	KALYANA SUNDARAM S	6 24	1,5	2	2			6 24	1,5	2	2			6 24	2*1	1			1	
147	NITHIKUMAR M	6 36	1,5	2	2			6 12	1,5	2	2			6 12	1*1	1			1	
148	MURUGAN P	5 60	1	3	2			6 60	1	3	2			6 60	2*3	1	1			
149	MUNIYANDI K	6 6	1	1	2			6 6	1	1	2			6 6	1*1	1	1			
150	CHELLATHAI	PL	1,2,5	4	**1**		1	PL	1,2,5	4	**1**			PL	0	4				0
151	ALPHONSE MARY S	1 60	1,2,5	3	2			HM	1,2,5	3	2	1	1	HM	0	4				0
152	PALRAJ K	6 12	1	2	2			6 12	1	2	2			6 12	2*2	1	1			
153	KATHIRI VEL G	6 12	1	2	2			6 9	1	2	2			6 9	1*1	1	1			
154	CHELLATHAI	6 12	1	2	2			6 12	1	2	2			6 12	1*1	1	1			
155	VALARMATHI R	PL	1,2,5	4	2	**1**	1	PL	1,2,5	4	2			PL	0	4				0
156	VELAYEE K	6 12	1,2,5	2	2			6 12	1,2,5	2	2			6 12	1*1	1				1
157	VARADHARAJAN K	6 60	1,2	2	2			6 24	1,2	2	2			6 24	2*2	1		1		
158	MOHAMED AFRIDI K	6 12	1	2	2			6 12	1	2	2			6 12	2*1	1	1			
159	ADHI NARAYANAN CH	1 60	1,2,5	2	2			1 60	1,2,5	2	**1**		1	1 60	0	4				0
160	LAKSHMI A	6 24	1,2	2	2			6 24	1,2	2	2			6 24	2*1	1		1		
161	VENKATA RAO Y	PL	1,2,5	4	**1**		1	PL	1,2,5	4	**1**			PL	0	4				0
162	PENCHALAIAH N	6 9	1,2	1	2			6 9	1,2	1	2			6 9	1*1	1		1		
163	AJITH M	6 24	1	2	2			6 24	1	2	2			6 24	1*2	1	1			
164	INDIRAN C	HM	1,2,5	4	2	**1**	1	HM	1,2,5	4	2			HM	0	4				0
165	NAZEER HUSSAIN S	6 18	1	2	2			6 18	1	2	2			6 18	2*2	1	1			
166	CHINNATHAMBI	6 60	1	2	2			6 60	1	2	2			6 60	3*3	1	1			
167	SAHAYAMARY A	HM	1,2,5	4	**1**		1	HM	1,2,5	4	**1**			HM	0	4				0
168	JOHN S	6 12	1	2	2			6 12	1	2	2			6 12	2*1	1	1			
169	KARUPPAIAH A	6 36	1,5	2	2			6 24	1,5	2	2			6 24	2*2	1			1	
170	SWAMINATHAN	PL	1,2,5	4	**1**		1	PL	1,2,5	4	**1**			PL	0	4				0
171	AYYANAR K	6 18	1	2	2			6 12	1	2	2			6 12	1*1	1	1			
172	ARUNACHALA THAI	6 36	1	2	2			6 24	1	2	2			6 24	2*1	1	1			
173	GANESAN V	6 60	1	2	2			6 60	1	2	2			6 60	3*2	1	1			
174	MUTHUPANDI A	HM	1,2,5	3	2			HM	1,2,5	3	**1**		1	HM	0	4				0
175	PERIYASAMY	6 18	1	2	2			6 18	1	2	2			6 18	2*1	1	1			
176	MUTHURAMAN K	6 36	1	2	2			6 9	1	2	2			6 9	1*1	1	1			
177	MARKKANDAN O	6 18	1	2	2			6 12	1	2	2			6 12	1*1	1	1			
178	RAMANA REDDY	6 24	1,2	2	2			6 9	1,2	2	2			6 9	2*1	1		1		
179	LALITHA	1 60	1,2,5	2	2			1 60	1,2,5	2	2			1 60	4*5	1				1
180	KRISHNAMMAL A	6 60	1,2	3	2			6 24	1,2	3	2			6 24	2*2	1		1		
181	CHINNAMMAL R	6 18	1	2	2			6 12	1	2	2			6 12	1*1	1	1			
182	NAGAMMAL V	6 6	1,2	1	2			6 6	1,2	1	2			6 6	1*1	1		1		
183	VELLAIAMMAL V	6 36	1,5	2	2			6 18	1,5	2	2			6 18	2*2	1			1	
184	AKKINI S.	6 24	1	2	2			6 18	1	2	2			6 18	2*2	1	1			
185	BOOMINATHAN M.	6 9	1	1	2			6 9	1	1	2			6 9	1*1	1	1			
186	CHELLAMMAL P.	HM	1,2,5	3	2			HM	1,2,5	3	2			HM	6*6	1				1
187	MUTHUSAMY N.	5 60	1,5	3	2			6 36	1,5	3	2			6 36	2*3	1			1	
188	CHELLA PERUMAL P.	HM	1,2,5	4	2	**1**	1	HM	1,2,5	4	2			HM	0	4				0
189	NARAYANAN M.	6 60	1,5	3	2			6 60	1,5	3	2			6 24	2*2	1			1	
190	PALANISAMY A.	6 60	1,2	2	2			6 60	1,2	2	2			6 60	2*3	1		1		
191	PETCHIAMMAL	6 12	1	2	2			6 12	1	2	2			6 12	1*2	1	1			
192	VIGNESH MUTHU KUMAR V. DR	6 60	1	2	2			6 60	1	2	2			6 60	2*2	1	1			
193	ARUNACHALAM T.	6 60	1,2	2	2			6 36	1,2	2	2			6 36	2*2	1		1		
194	SANGILI A.	6 60	1	2	2			6 24	1	2	2			6 24	1*2	1	1			

195	BALAMURUGAN K.	5 60	1,5	2	2			5 60	1,5	2	2			5 60	3*3	1			1	
196	FATHIMA MARY A.	6 36	1	2	2			6 36	1	2	2			6 36	2*2	1	1			
197	VEERAMMAL R.	6 18	1,5	2	2			6 12	1,5	2	2			6 12	1*2	1			1	
198	MANIKANDAN C.	6 24	1	2	2			6 18	1	2	2			6 18	1*1	1	1			
199	MALYADRI K.	6 60	1	3	2			6 60	1	3	2			6 60	2*3	1	1			
200	HUSSAIN BI	6 60	1	2	2			6 60	1	2	2			6 60	2*2	1	1			
201	PRABHU C.	6 36	1,5	2	2			6 24	1,5	2	2			6 24	2*2	1				
202	MADASAMY K.	6 36	1,5	2	2			6 12	1,5	2	2			6 12	1*2	1			1	
203	MANIMEGALAI M.	6 24	1	2	2			6 24	1	2	2			6 9	2*1	1	1			
204	SUKUMAR P.	6 18	1,5	2	2			6 18	1,5	2	2			6 18	2*2	1			1	
205	MUTHURAMAN C.	1 60	1,2,5	3	2			1 60	1,2,5	3	**1**		1	1 60	0	4				0
206	KOTA MALAKONDAREDDY	HM	1,2,5	3	2			HM	1,2,5	3	2			HM	6*6	1				1
207	RAMACHANDRAN P.	6 60	1	2	2			6 36	1	2	2			6 36	2*2	1	1			
208	GOVINDARAJAN S.	1 60	1,2,5	2	2			1 60	1,2,5	2	2	**1**	1	1 60	0	4				0
209	NOORJAHAN H.	6 24	1,2	2	2			6 24	1,2	2	2			6 24	2*2	1		1		
210	MOHAN R.	HM	1,2	3	2			HM	1,2	3	**1**		1	HM	0	4		0		
211	GOPINATH K.	6 9	1	2	2			6 9	1	2	2			6 9	2*2	1	1			
212	AMIRTHAM S.	6 18	1	2	2			6 18	1	2	2			6 18	2*2	1	1			
213	SULOCHANA K	6 36	1,5	2	2			6 12	1,5	2	2			6 12	2*2	1			1	
214	RASU K.	6 24	1,5	2	2			6 24	1,5	2	2			6 24	2*2	1			1	
215	MANICKAM M	6 12	1	2	2			6 12	1	2	2			6 12	2*1	1	1			
216	PANJAVARNAM R.	6 60	1,5	2	2			6 36	1,5	2	2			6 36	2*3	1			1	
217	LAKSHMI S.	6 36	1	2	2			6 36	1	2	2			6 36	3*2	1	1			
218	VALLIAPPAN P.	6 36	1	2	2			6 36	1	2	2			6 36	2*2	1	1			
219	MURUGAN S.	HM	1,2,5	4	**1**		1	HM	1,2,5	4	**1**			HM	0	4				0
220	SOUNDARAJAN K.	6 36	1,2	2	2			6 36	1,2	2	2			6 18	2*1	1		1		
221	PALANIAMMAL	6 6	1	1	2			6 6	1	1	2			6 6	1*1	1	1			
222	CHINNAMMAL V.	6 24	1,5	2	2			6 24	1,5	2	2			6 24	2*2	1			1	
223	POUN M.	6 6	1	1	2			6 6	1	1	2			6 6	1*1	1	1			
224	ANTONY DOSS A.	6 60	1,3	3	2			6 60	1,3	3	2			6 60	2*3	1		1		
225	KALIYATHAL K.	6 60	1	2	2			6 60	1	2	2			6 60	3*3	1	1			
226	VIJAYAMMA	HM	1,2,5	3	2			HM	1,2,5	3	2			HM	4*4	1				1
227	VALLIAMMAL K.	6 60	1	2	2			6 60	1	2	2			6 60	3*2	1	1			
228	MARIAPPAN P.	6 12	1	2	2			6 12	1	2	2			6 12	2*1	1	1			
229	VIJAYALAKSHMI A.	6 24	1,5	2	2			6 24	1,5	2	2			6 24	2*2	1			1	
230	VEL MURUGAN	6 18	1,5	2	2			6 18	1,5	2	2			6 18	1*2	1			1	
231	PALANISAMY V.	6 24	1,5	2	2			6 24	1,5	2	2			6 24	2*1	1			1	
232	MURASOLI R.	FCF	1,2,5	4	**1**		1	FCF	1,2,5	4	**1**			FCF	0	4				0
233	POTTU M.	HM	1,2,5	3	2			HM	1,2,5	3	2			HM	6*6	1				1
234	RAYAPPAN S.	6 60	1,5	3	2			6 12	1,5	3	2			6 12	2*2	1			1	
235	MEENA R.	6 60	1,2	2	2			6 36	1,2	2	2			6 36	2*3	1		1		
236	SUBBULAKSHMI S.	HM	1,2,5	3	2			HM	1,2,5	3	2	**1**	1	HM	0	5				0
237	VENKATAIAH P.	6 24	1,2	2	2			6 24	1,2	2	2			6 24	2*1	1		1		
238	MUSALAIAH V.	6 36	1,5	2	2			6 18	1,5	2	2			6 18	1*2	1			1	
239	SUBRAMANIYAM ACHARI K.	6 12	1	2	2			6 12	1	2	2			6 12	1*1	1	1			
240	MURUGATHAL V.	6 60	1,5	2	2			6 60	1,5	2	2			6 60	3*3	1			1	
241	MARIYA AROCKIAM K.	PL	1,2,5	4	**1**		1	PL	1,2,5	4	**1**			PL	0	4				0
242	THAYAMMAL C.	6 36	1,5	2	2			6 36	1,5	2	2			6 36	2*2	1			1	
243	DHANALAKSHMI K.	6 60	1	2	2			6 60	1	2	2			6 24	2*2	1	1			
244	PANDIAN M.	6 36	1,5	2	2			6 18	1,5	2	2			6 18	4*2	1			1	
245	DAGGUPATI SUBBAIAH	6 60	1,5	2	2			6 60	1,5	2	2			6 12	3*3	1			1	

246	SRIDHAR R.	6 36	1,2	2	2			6 24	1,2	2	2			6 24	2*2	1		1		
247	BOPPANA CHINA VENKATESWARLU	6 24	1	2	2			6 24	1	2	2			6 24	2*1	1	1			
248	CHELLATHAL K.	6 36	1	2	2			6 36	1	2	2			6 36	2*2	1	1			
249	NATESAPILLAI T.	6 18	1	2	2			6 9	1	2	2			6 9	1*1	1	1			
250	SANKARALINGAM I.	6 36	1,2	2	2			6 36	1,2	2	2			6 36	2*2	1		1		
251	CHINNAPILLAI R.	6 24	1	2	2			6 24	1	2	2			6 24	1*2	1	1			
252	CHINNAMMAL S.	6 12	1	2	2			6 12	1	2	2			6 12	1*1	1	1			
253	KUMAR M.	6 9	1,5	2	2			6 9	1,5	2	2			6 9	1*1	1			1	
254	AYYAKALAI	6 12	1,5	2	2			6 12	1,5	2	2			6 12	1*2	1			1	
255	KATHAMMAL N.	HM	1,2,5	3	2			HM	1,2,5	3	2			HM	4*4	1				1
256	NAGARAJ R.	6 36	1,2	2	2			6 36	1,2	2	2			6 36	2*2	1		1		
257	VIJAYALAKSHMI B.	5 60	1,5	2	2			5 60	1,5	2	2			6 24	2*2	1			1	
258	SELVARAJ	2 60	1,2,5	3	2			2 60	1,2,5	3	2			2 60	4*4	1				1
259	RAJENDRAN T.	PL	1,2,5	3	2			PL	1,2,5	3	2			PL	6*6	1				1
260	PANJAVARNAM R.	HM	1,2,5	4	**1**		1	HM	1,2,5	4	**1**			HM	0	4				0
261	SENTHAMARAI KANNAN R.	6 60	1,2	3	2			6 60	1,2	3	2			6 60	3*3	1		1		
262	PERUMAL K.	5 60	1,2,5	2	2			6 60	1,2,5	2	2			6 60	4*3	1				1
263	SEETHAIYAMMAL R.	6 18	1,5	2	2			6 18	1,5	2	2			6 18	2*2	1			1	
264	IBRAHIM SHA S.	6 9	1	1	2			6 9	1	1	2			6 9	1*1	1	1			
265	NAGAMMA N.	6 9	1	2	2			6 9	1	2	2			6 9	1*1	1	1			
266	MANI R.	1 60	1,2,5	3	2			1 60	1,2,5	3	**1**		1	1 60	0	4				0
267	RAVICHANDRAN	6 36	1,2	2	2			6 36	1,2	2	2			6 12	2*1	1		1		
268	ARUMUGAM A.	6 18	1	2	2			6 12	1	2	2			6 12	1*1	1	1			
269	DHASTHAGIRI G.	6 36	1	2	2			6 36	1	2	2			6 36	2*2	1	1			
270	TAJ NISHA.H	6 24	1,5	2	2			6 24	1,5	2	2			6 24	2*2	1			1	
271	POLA SETTI KOTTESWARA RAO	6 36	1,5	2	2			6 12	1,5	2	2			6 12	2*2	1			1	
272	MURUGANATHAN	HM	1,2,5	4	**1**		1	HM	1,2,5	4	**1**			HM	0	4				0
273	THIRUMURUGAN T.	6 60	1,5	3	2			6 60	1,5	3	2			6 60	2*2	1			1	
274	MUTHURAJ A.	6 12	1	2	2			6 12	1	2	2			6 12	1*1	1	1			
275	NAMBURANI P.	6 12	1,5	2	2			6 12	1,5	2	2			6 12	1*1	1			1	
276	DHANALAKSHMI M.	6 9	1,5	2	2			6 9	1,5	2	2			6 9	1*2	1			1	
277	SEENIVASAN T.	6 12	1	2	2			6 12	1	2	2			6 12	1*1	1	1			
278	RABIYA M.	6 36	1,2	2	2			6 36	1,2	2	2			6 36	2*2	1		1		
279	IRULRAJA P.	6 24	1,5	2	2			6 24	1,5	2	2			6 24	2*2	1			1	
280	MUNIAMMAL K.	HM	1,2,5	4	**1**		1	HM	1,2,5	4	**1**			HM	0	4				0
281	MOOKKAMMAL	6 36	1,2	2	2			6 36	1,2	2	2			6 36	2*2	1		1		
282	NEELA MEGAM M.	6 18	1	2	2			6 18	1	2	2			6 18	2*2	1	1			
283	KADIRI NAGAMMA	6 24	1,3	2	2			6 24	1,3	2	2			6 24	2*3	1		1		
284	ANDAL	PL	1,2,5	3	2			PL	1,2,5	3	**1**	**1**	1	PL	0	4				0
285	SIVARAMAN K.	HM	1,2,5	3	2			HM	1,2,5	3	2			HM	5*5	1				1
286	MURUGAIAH	6 60	1,2	2	2			6 60	1,2	2	2			6 36	2*2	1		1		
287	ELUMALAI A.	6 60	1,2	2	2			6 60	1,2	2	2			6 60	2*3	1		1		
288	RAMASAMY V.	6 36	1,5	2	2			6 36	1,5	2	2			6 36	3*3	1			1	
289	KANNADASAN S.	PL	1,2,5	4	**1**		1	PL	1,2,5	4	**1**			PL	0	4				0
290	PARIMALA	6 60	1,2	2	2			6 24	1,2	2	2			6 24	2*3	1		1		
291	ESWARI V.	6 24	1,5	2	2			6 24	1,5	2	2			6 24	2*2	1			1	
292	BALAKRISHNAN D.	HM	1,2,5	4	**1**		1	HM	1,2,5	4	**1**			HM	0	4				0
293	MALAR KODI J.	PL	1,2,5	3	2			PL	1,2,5	3	2			PL	5*6	1				1
294	KALIAMAML P.	6 9	1	1	2			6 9	1	1	2			6 9	1*1	1	1			

295	MATHAMMAL V.	6 18	1	2	2			6 18	1	2	2			6 18	1*1	1	1			
296	MARIAMMAL S.	6 12	1,5	2	2			6 12	1,5	2	2			6 12	2*1	1			1	
297	PALANISAMY	6 18	1,5	2	2			6 18	1,5	2	2			6 18	2*2	1			1	
298	MAYANDI R.	6 60	1,2	3	2			6 60	1,2	3	2			6 60	4*4	1		1		
299	MAHALINGAM M.	HM	1,2,5	4	**1**		1	HM	1,2,5	4	**1**			HM	0	4				0
300	MAHALINGAM M.	6 18	1,5	2	2			6 18	1,5	2	2			6 18	2*2	1			1	
301	NAGAMMA K.	6 12	1	2	2			6 9	1	2	2			6 9	1*1	1	1			
302	KANNAN D.	6 12	1	2	2			6 12	1	2	2			6 12	1*1	1	1			
303	KALIMUTHU M.	HM	1,2,5	4	**1**		1	HM	1,2,5	4	**1**			HM	0	4				0
304	NITHISH KUMAR S.	6 36	1,5	2	2			6 36	1,5	2	2			6 36	2*2	1			1	
305	LAKSHMI R.	6 12	1	2	2			6 12	1	2	2			6 12	1*1	1	1			
306	SASTIVEL M.A.	6 24	1,2	2	2			6 24	1,2	2	2			6 24	2*2	1		1		
307	RAJU A.	6 9	1	2	2			6 9	1	2	2			6 9	1*1	1	1			
308	AYOTHI RAMAN K.	6 12	1	2	2			6 6	1	2	2			6 6	1*1	1	1			
309	BALAMURUGAN G.	HM	1,2,5	3	2			HM	1,2,5	3	2			HM	5*5	1				1
310	PETCHIAMMAL	6 60	1,5	2	2			6 60	1,5	2	2			6 60	4*2	1			1	
311	SUBBAIAH M	6 12	1	2	2			6 12	1	2	2			6 9	2*1	1	1			
312	NALLAMMAL .R	6 24	1	2	2			6 24	1	2	2			6 24	2*1	1	1			
313	SEENIAMMAL K.	5 60	1,5	2	2			5 60	1,5	2	2			5 60	4*4	1			1	
314	DEIVANAI	6 12	1	2	2			6 12	1	2	2			6 12	2*2	1	1			
315	LAKSHMI J.	6 36	1,5	2	2			6 24	1,5	2	2			6 24	2*2	1			1	
316	VADIVEL P.	6 18	1,5	2	2			6 18	1,5	2	2			6 18	2*1	1			1	
317	MADHUSUDHAN	3 60	1,2,5	3	2			3 60	1,2,5	3	2			6 60	4*4	1				1
318	RASU E.	6 36	1,2	2	2			6 36	1,2	2	2			6 36	2*1	1		1		
319	SANGEETHA R.	6 12	1,5	2	2			6 12	1,5	2	2			6 12	1*1	1			1	
320	SUBBARAYUDU	6 24	1	2	2			6 12	1	2	2			6 12	2*2	1	1			
321	BOSE	PL	1,2,5	4	**1**		1	PL	1,2,5	4	**1**			PL	0	4				0
322	MURUGATHAL M.	6 60	1,3	2	2			6 60	1,3	2	2			6 60	3*3	1		1		
323	ALAGAN L.	5 60	1,2	2	2			6 60	1,2	2	2			6 60	3*3	1		1		
324	NATARAJAN R.	6 18	1	2	2			6 12	1	2	2			6 12	1*1	1	1			
325	PAKKIRAMMA	HM	1,2,5	4	**1**		1	HM	1,2,5	4	**1**			HM	0	4				0
326	THATHAR GOUNDAR	6 60	1	3	2			6 60	1	3	2			6 60	2*2	1	1			
327	PITCHAIAMMAL G.	6 12	1	2	2			6 12	1	2	2			6 12	1*1	1	1			
328	GANGA BHAVANI	6 24	1	2	2			6 24	1	2	2			6 24	1*2	1	1			
329	PONNAMMAL R.	6 18	1	2	2			6 18	1	2	2			6 18	1*1	1	1			
330	BALKEES BEEVI	6 9	1	1	2			6 9	1	1	2			6 9	1*1	1	1			
331	SUNTHARI	HM	1,2,5	3	2			HM	1,2,5	3	**1**		1	HM	0	4				0
332	CHINNA SUBBAIAH T.	6 36	1,2	2	2			6 36	1,2	2	2			6 36	3*2	1		1		
333	AMSATHAL K.	6 12	1	2	2			6 12	1	2	2			6 12	2*1	1	1			
334	MURUGAN	6 24	1,2	2	2			6 12	1,2	2	2			6 12	1*1	1		1		
335	THANGARAJ A.	6 12	1	2	2			6 12	1	2	2			6 12	1*1	1	1			
336	ANEESH SIVANANDAN	6 12	1	2	2			6 12	1	2	2			6 12	1*2	1	1			
337	BALAYAPALLI SUJATHA	6 60	1,5	2	2			6 60	1,5	2	2			6 60	2*2	1			1	
338	PAPPAYEE	6 24	1,5	2	2			6 24	1,5	2	2			6 24	2*2	1			1	
339	KUPPUSWAMI C.	HM	1,2,5	3	2			HM	1,2,5	3	**1**		1	HM	0	5				0
340	RAVI D.	6 24	1,2	2	2			6 24	1,2	2	2			6 24	2*1	1		1		
341	SURIYAKALA K	6 18	1,2	2	2			6 18	1,2	2	2			6 18	1*1	1		1		
342	SANGARA NARAYANAN S.	6 24	1	2	2			6 12	1	2	2			6 12	1*1	1	1			
343	PENCHALAIAH	PL	1,2,5	4	**1**		1	PL	1,2,5	4	**1**			PL	0	4				0
344	THANGA RAJ	5 60	1,2,5	2	2			5 60	1,2,5	2	2			5 60	4*3	1				1
345	KRISHNAVENI S.	6 24	1,2	2	2			6 24	1,2	2	2			6 24	2*2	1		1		

346	MUTHUSAMY M.	6 60	1,2	3	2			6 60	1,2	3	2			6 60	2*2	1		1		
347	PAPPA R.	PL	1,2,5	3	2			PL	1,2,5	3	2			PL	4*4	1				1
348	MURUGAN V.	6 12	1,2	2	2			6 9	1,2	2	2			6 9	2*1	1		1		
349	ASWATHI KIRUBAA	6 60	1,2	2	2			6 60	1,2	2	2			6 60	2*2	1		1		
350	PANCHAVARNAM	6 24	1	2	2			6 24	1	2	2			6 24	2*2	1	1			
351	LAKSHMI A	6 36	1,2	2	2			6 36	1,2	2	2			6 36	2*2	1		1		
352	BYROS KHAN R	HM	1,2,5	2	2			HM	1,2,5	2	**1**		1	HM	0	4				0
353	JANGAM REDDY	6 36	1	2	2			6 36	1	2	2			6 18	1*1	1	1			
354	ALAGAMMAL	6 12	1	2	2			6 12	1	2	2			6 12	1*1	1	1			
355	ANANTHAN R.	6 12	1	2	2			6 12	1	2	2			6 12	2*1	1	1			
356	MUTHAMMAL M.	6 9	1,2	2	2			6 9	1,2	2	2			6 9	1*1	1		1		
357	CHANDRASEKARAN K.	6 60	1	2	2			6 60	1	2	2			6 60	2*2	1	1			
358	VIVEKANANDAN G.	6 60	1,5	2	2			6 36	1,5	2	2			6 36	2*2	1			1	
359	AJITH S.	2 60	1,5	3	2			5 60	1,5	3	2			5 60	2*2	1			1	
360	SUBBAMMA	6 60	1,2	3	2			6 60	1,2	3	2			6 60	2*2	1		1		
361	MURUGESAN K	6 18	1	2	2			6 18	1	2	2			6 18	1*1	1	1			
362	DHANAPALAN P.	6 9	1	2	2			6 9	1	2	2			6 9	1*1	1	1			
363	ABISHEK M.	6 12	1	2	2			6 12	1	2	2			6 12	1*1	1	1			
364	RASATHI	6 6	1,5	1	2			6 6	1,5	1	2			6 6	1*1	1			1	
365	THANGAM G.	6 36	1,5	2	2			6 36	1,5	2	2			6 36	2*2	1			1	
366	RAMAR P.	6 36	1,2	2	2			6 12	1,2	2	2			6 12	2*1	1		1		
367	MURUGAPPAN	6 18	1	2	2			6 18	1	2	2			6 18	1*2	1	1			
368	SUBRAMANI R.	6 60	1,2	2	2			6 60	1,2	2	2			6 60	3*3	1		1		
369	RAM THAI	6 60	1,5	2	2			6 60	1,5	2	2			6 60	3*2	1			1	
370	THANKA R.	6 24	1,5	2	2			6 24	1,5	2	2			6 24	2*1	1			1	
371	ALAGUTHAI.R	HM	1,2,5	4	**1**		1	HM	1,2,5	4	**1**			HM	0	4				0
372	MUTHU MURUGAN K.	6 36	1	2	2			6 36	1	2	2			6 36	2*2	1	1			
373	PITCHAI A.	4 60	1,2,5	3	2			4 60	1,2,5	3	2			4 60	3*4	1				1
374	AMEENA J.	6 36	1	2	2			6 36	1	2	2			6 36	2*2	1	1			
375	RAVI K.	6 24	1	2	2			6 12	1	2	2			6 12	2*2	1	1			
376	YANAMALA LAKSHMI NARAYANA	6 24	1,5	2	2			6 24	1,5	2	2			6 24	2*3	1			1	
377	SAKTHIVEL M.	6 36	1,5	2	2			6 36	1,5	2	2			6 36	3*2	1			1	
378	LAKSHMI DEVI	6 60	1	2	2			6 60	1	2	2			6 24	2*2	1	1			
379	MATHAVANAI P.	6 18	1,5	2	2			6 12	1,5	2	2			6 12	1*2	1			1	
380	RAJAMANICKAM	6 9	1	1	2			6 9	1	1	2			6 9	1*1	1	1			
381	RATHINAM S.	6 12	1,2	2	2			6 12	1,2	2	2			6 12	1*1	1		1		
382	JEYA PRAKASH R.	6 12	1,2	2	2			6 12	1,2	2	2			6 12	1*2	1		1		
383	ANANDHARAJ L.	6 9	1	2	2			6 9	1	2	2			6 9	1*1	1	1			
384	RAMANAIAH	6 60	1,5	3	2			6 60	1,5	3	2			6 60	2*2	1			1	
385	SAMI	6 60	1	2	2			6 60	1	2	2			6 36	2*2	1	1			
386	TAMILARASAN P.	6 12	1,2	2	2			6 12	1,2	2	2			6 12	2*2	1		1		
387	ALAGU VEL	6 36	1	2	2			6 24	1	2	2			6 24	2*2	1	1			
388	SHANMUGARAJ S.	6 60	1,5	2	2			6 60	1,5	2	2			6 60	3*3	1			1	
389	MEENA S.	6 12	1	2	2			6 12	1	2	2			6 12	2*1	1	1			
390	AYYAKANNU V	HM	1,2,5	4	2	**1**	1	HM	1,2,5	4	2			HM	0	4				0
391	MOHAN RAJ	6 60	1	3	2			6 60	1	3	2			6 60	2*2	1	1			
392	GOVINDHARASU G.	6 18	1	2	2			6 18	1	2	2			6 18	1*1	1	1			
393	SILVAR STAR S	6 24	1,5	2	2			6 24	1,5	2	2			6 24	3*3	1			1	
394	BANDISELLA BRAMAIAH	6 24	1	2	2			6 12	1	2	2			6 12	2*1	1	1			
395	YOGESHWARAN	6 36	1	2	2			6 36	1	2	2			6 36	2*2	1	1			

396	PANCHAVARNAM	6 60	1,5	2	2			6 60	1,5	2	2			6 60	3*3	1			1	
397	IRUDHAYARAJ S.	PL	1,2,5	4	**1**		1	PL	1,2,5	4	**1**			PL	0	4				0
398	VADIVEL C.	6 24	1	2	2			6 24	1	2	2			6 24	2*2	1	1			
399	ALAGAMMAL C.	6 9	1	2	2			6 9	1	2	2			6 9	1*1	1	1			
400	MURUGESWARI R.	6 24	1,5	2	2			6 18	1,5	2	2			6 18	1*2	1			1	
401	GURUMURUGAN B.	6 9	1	1	2			6 9	1	1	2			6 9	1*1	1	1			
402	CHINNAMMAL R.	6 24	1	2	2			6 24	1	2	2			6 24	1*2	1	1			
403	SHAIK KHADAR MASTAN	6 12	1	2	2			6 12	1	2	2			6 12	1*1	1	1			
404	LAKSHMI M.	6 60	1,5	2	2			6 36	1,5	2	2			6 18	1*1	1			1	

CODING SHEET		
	MALE	1
GENDER	FEMALE	2
	20-30	1
	31-40	2
AGE	41-50	3
	51-60	4
	61-70	5
	AGRICULTURE WORKER/ F	1
	LABOURER	2
OCCUPATION	TRADESMAN/ PROFESSIO	3
	UNEMPLOYED	4
	RIGHT EYE	1
EYE	LEFT EYE	2
	YES	1
TRAUMA	NO	2
	VEGETABLE MATTER	1
	THORN OR TREE BRANCH	2
MODE OF TRAUMA	ANIMAL MATTER	3
	DUST	4
	FINGERNAIL	5
	OTHERS	6
	DM	1
	HTN	2
SYSTEMIC	BOTH DM AND HTN	3
	NIL	4
	YES	1
RECENT TOPICAL	NO	2
RECENT SYSTEMIC	YES	1
	NO	2
	MOTHER'S MILK	1
RECENT NATIVE MEDS	OIL	2
	CHICKEN BLOOD	3
	TONGUE	4
	NIL	5
	YES	1
OCULAR SX	NO	2

HYPOPYON	YES	1
	NO	2
	FUSARIUM	1
CULTURE	ASPERGILLUS	2
	0- 33%	2
DEPTH	34-67%	3
	68-100%	4
SMEAR	FUNGUS PRESENT	1
	FUNGUS ABSENT	2
	NATAMYCIN	1
RX	VORICONAZOLE	2
	ITRACONAZOLE	5
PERFORATION	YES	1
	NO	2
IMPENDING PERFORATION	YES	1
	NO	2
WORSENING OF ULCER	YES	1
	NO	2
TPK DONE	YES	1
	NO	2
	HEALED	1
IMPRESSION	HEALING	2
	REMAINED SAME	3
	WORSENED	4
HEALED WITH ONE DRUG	1	
HEALED WITH TWO DRUGS A	2	
HEALED WITH TWO DRUGS B	3	
HEALED WITH MORE THAN TWO DRUGS	4	